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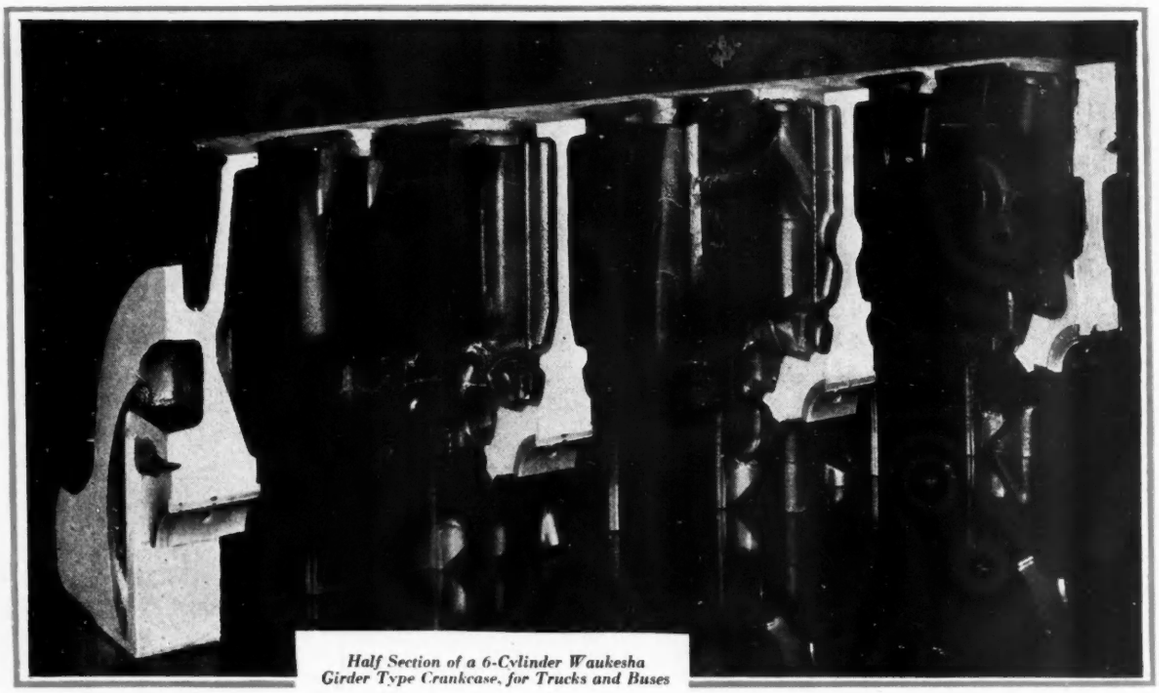

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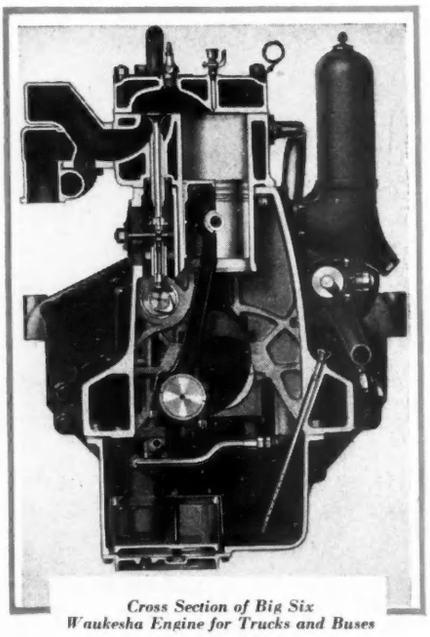

Cross Section of Big Six Waukesha Engine for Trucks and Buses

966

WAUKESHA ENGINES

AUTOMOTIVE INDUSTRIES
AUTOMOBILE

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Established 1902

Vol. 61 No. 9

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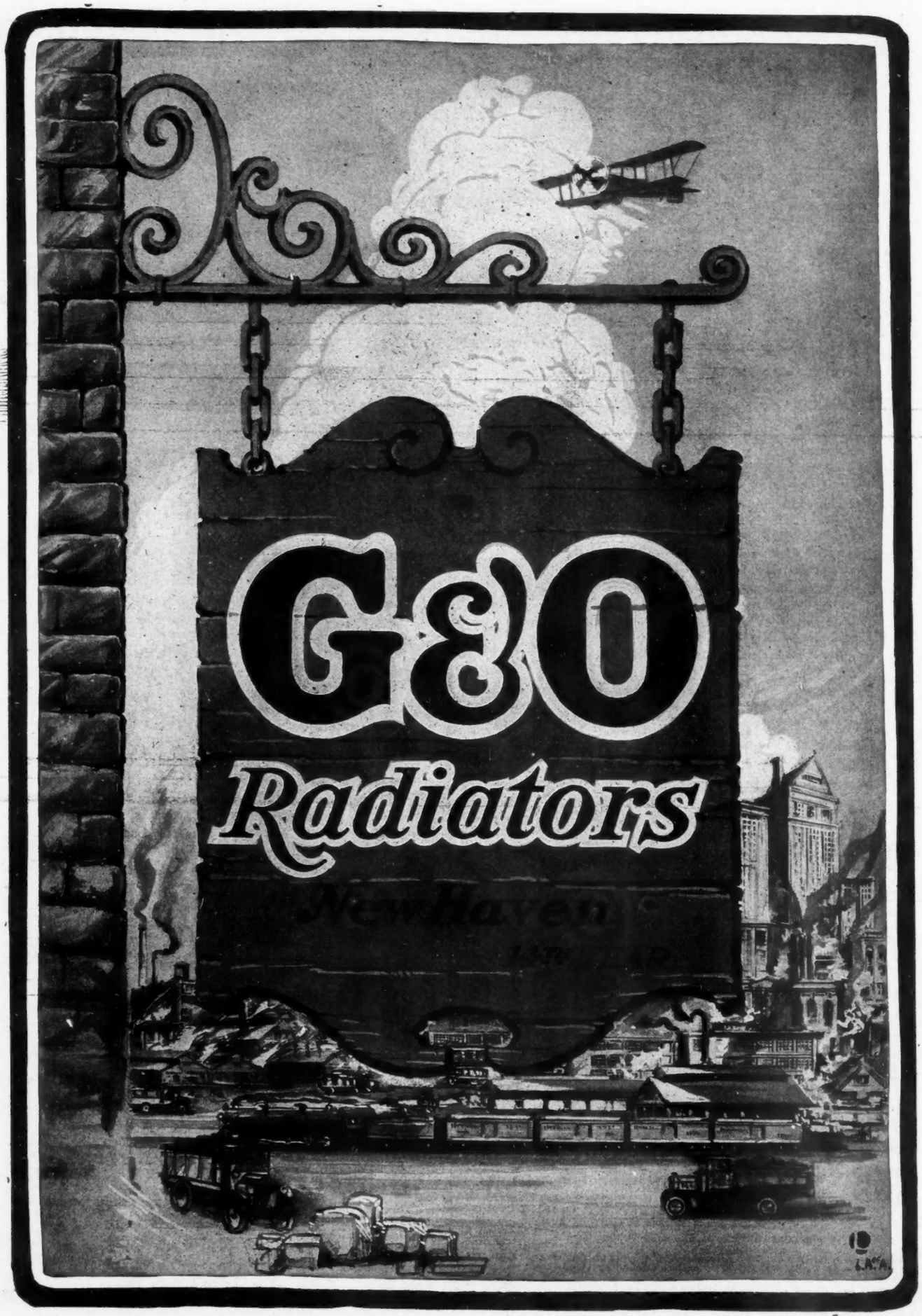

G&O
Radiators

AUTOMOTIVE INDUSTRIES

VOLUME 61 *Philadelphia, Saturday, August 31, 1929* NUMBER 9

New Peak in Earnings Reported By Parts and *Accessory Makers*

Returns for first six months of 1929 exceed those for any similar period in the history of that phase of the automotive industry. A record year is predicted.

By EARL O. EWAN

INABILITY of several representative automobile manufacturers to realize unprecedented earnings from new records established in mass production in the first six months of 1929, which was indicated on these pages last week, was not reflected in financial statements of most parts and accessory makers for the first half of this year. The surpassingness of returns recorded by the majority of concerns in the parts and accessory business not only marks a pecuniary peak unrivaled by any representing a similar period in their previous history, but practically assures them of a corresponding landmark for the twelvemonth at the close of 1929.

Fairly exemplary of the prosperity reported among equipment purveyors are the incomes of ten companies and corporations listed in the accompanying table. Their earnings for the first six months of 1928 aggregated $24,866,484, as compared with $40,313,191 for the first half of 1929, an increase of 62 per cent. Such figures are particularly impressive when one recalls that the showing made by this phase of the automotive industry in 1928 was the best it had experienced up to that time.

Further interesting facts and statistics in this connection are given by the Motor and Equipment Association, which reports that "Parts-accessory makers have ended the first half with business substantially ahead of any previous six months' period in the history of the industry, and, although operations declined seasonally in June and July, the general level of activity is higher than is usual for the summer months. Favorable business, probably ahead of last year, seems assured for the third quarter. Original equipment, service parts and service equipment makers have had their greatest half year.

"Aggregate shipments in June of 180 manufacturers in the M. E. A.," the report continues, "were 208 per cent of the January, 1925, base, as compared with 245 in May, 254 in April, and 190 in June last year.

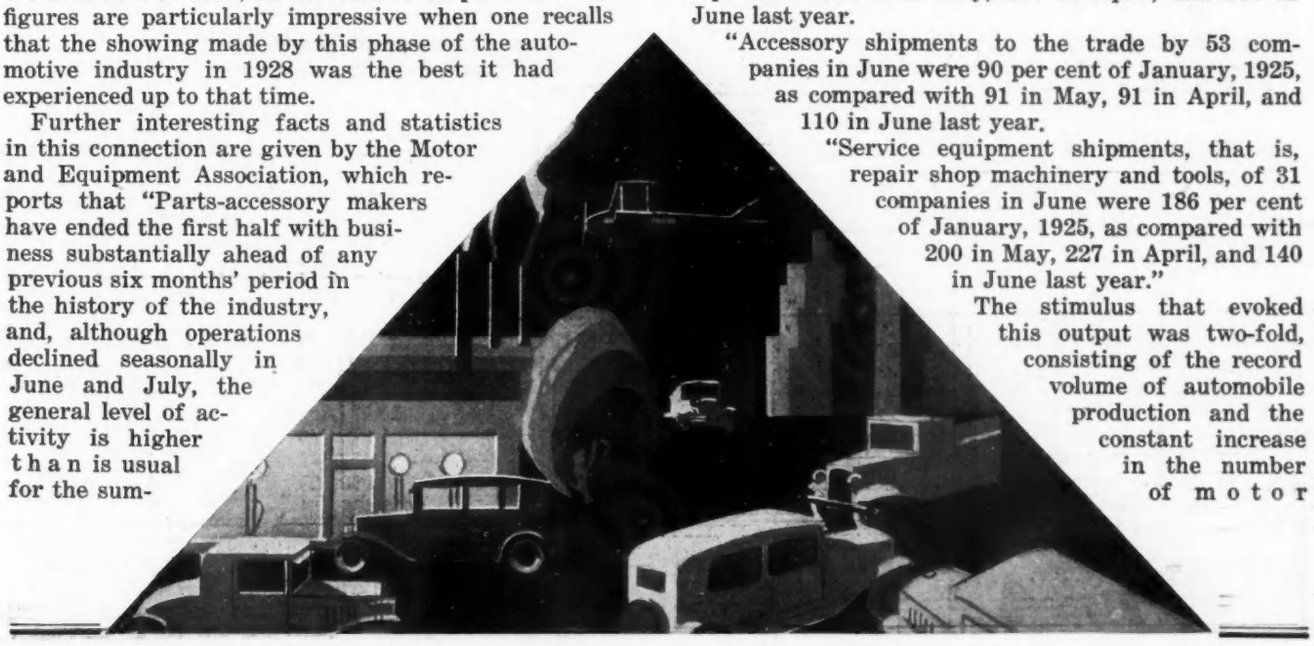
"One hundred and three parts-accessory manufacturers selling their products to the car and truck manufacturers for original equipment made shipments aggregating 231 per cent of the January, 1925, figure, which compares with 278 in May, 287 in April, and 200 in June last year.

"Shipments to the trade in June of 64 makers of service parts were 150 per cent of January, 1925, as compared with 169 in May, 174 in April, and 150 in June last year.

"Accessory shipments to the trade by 53 companies in June were 90 per cent of January, 1925, as compared with 91 in May, 91 in April, and 110 in June last year.

"Service equipment shipments, that is, repair shop machinery and tools, of 31 companies in June were 186 per cent of January, 1925, as compared with 200 in May, 227 in April, and 140 in June last year."

The stimulus that evoked this output was two-fold, consisting of the record volume of automobile production and the constant increase in the number of motor



vehicles registered. An especially sharp rise has been shown during recent months in the amount of original equipment business placed by automobile manufacturers. Included in that division have been all types of equipment, with organizations supplying the Ford Motor Co. reporting exceptional gains in sales.

As has been indicated by the report of the Motor and Equipment Association, the service equipment makers have been enjoying their most prosperous year. That is due, of course, to the exceptional demand of repair shops and garages for added equipment, which is attributed to the mounting registrations of motor cars.

Trade Recession Seasonal

The decline in accessory sales is not of recent inception, having been noticeable for several years as a result of the tendency of automobile manufacturers to equip more completely their vehicles at the factory.

The trade recession which began in May and continued in June and July was seasonal and the result of the usual decrease in those months of the number of vehicles run off assembly lines. This trend was offset partly, however, by the increased purchasing of replacement parts and accessories by consumers.

Although production has picked up this month as a result of the introduction of several new models, and the manufacture of others already announced or about to experience their debut, there will come shortly another tapering off in output, it is predicted, which naturally will have an adverse effect on the equipment business. It does not seem likely, however, that the majority of large, well-established firms will find the recession more severe than normal at that period of the year. Probably their earnings for the last six months of 1929 will compare favorably with those for the last half of 1928, or even exceed them, according to present indications, and with the gains scored in the first six months of this year, the returns for the whole of 1929 probably will establish new annual totals.

Strength of the parts and accessory business in the overseas market was indicated officially recently by the report of the Automotive Division of the Department of Commerce, which showed that the export of automobile parts for assembly registered in the first six months of 1929 a gain of $43,764,172, or 147 per cent.

Judging from reports for the first six months of 1929, the exceptional number of mergers among parts and accessory companies within the last year have had a beneficial effect on the industry.

Figures on the Canadian automobile business for 1928, just released by the Dominion Government, show that parts exported from there last year had a value of $3,416,978, as against $4,153,867 in 1927. Parts imported into Canada in 1928 had a value of $48,839,955, as against $31,852,100 in 1927.

There were 11 companies engaged in the production of automobiles in Canada in 1928 with 14 separate factories in operation throughout the year. Eleven of the factories were located in Ontario, two in Quebec and one in Manitoba.

Production in the automobile industry of the Dominion established a new high record in 1928 with an output having a total value of $162,867,495. The output for 1927 was valued at $128,700,514. The figures include the value of the cars produced, parts and accessories and also the amounts received for custom work and repairs at the factories. In 1928 the parts and accessories had a value of $12,949,249 and receipts for custom work and repairs amounted to $741,247.

Production at High Point

Automobile production alone attained a new mark of 242,054 cars with a sales value f.o.b. the plant of $149,176,999 in 1928. These figures represented an increase of 18 per cent in number and 22 per cent in value over the totals for 1926, which was the next best year.

Canadian export shipments in 1928 also showed a substantial increase, advancing sharply to 79,855 cars, worth $34,400,967, from 57,852 cars, valued at $28,939,873, in the previous year. Imports also touched a new peak with 47,408 cars, worth $40,832,876, as compared with 36,630 cars, valued at $31,542,416, imported during the previous year.

The growth of the production and profits of the parts and accessory business within the first six months of 1929 in the United States has been the result basically of the changed attitude within the last two years of automobile manufacturers toward parts and accessory companies. The former have come more and more to favor the policy of buying their parts and original equipment from concerns specializing in that type of production instead of making their own, as is known, largely because it reduces the amount of their overhead expense and enables them to control more closely their inventories of parts and equipment. There has followed rather naturally after the acceptance of this policy the allowance for parts and accessories of prices that will insure their makers of a reasonable profit and thus assure the car manufacturers of stable sources of supply.

Parts-Accessory Earnings for First Half Year

Incomes of the following ten parts and accessory manufacturers are a representative cross section of returns reported in the first six months of 1929 by concerns engaged in this phase of the automotive industry:

Company	Earnings for First Half of 1928	Earnings for First Half of 1929	Percentage of Difference
Bohn Aluminum	$1,644,089	$1,171,579	8
Continental Motors	807,498	582,418	—39
Motor Wheel	1,331,574	2,432,998	82
Timken Roller Bearing	6,395,572	8,449,198	32
Youngstown Sheet & Tube	4,154,407	10,537,373	153
Kelsey-Hayes Wheel	477,066	1,975,779	316
Briggs Mfg. Co.	2,053,553	2,422,697	17
Electric Auto-Lite	3,693,585	6,200,763	68
Marlin-Rockwell	965,806	1,402,014	45
Stewart-Warner	3,613,334	4,528,372	25
Totals	$24,866,484	$40,818,191	62

The Rover Sportsman's Saloon

Rover Motor Co. Offers Saloon Similar to *Sportsman's Coupe*

Body design follows general idea of close-coupled sedan on sports lines, with more roomy and comfortable seating accommodations in the rear. Priced at £435 to £474.

By M. W. BOURDON

DESPITE the popularity secured in a relatively short time by the type of bodywork introduced last year by the Rover Motor Co., England, and termed the "sportsman's coupe" (a type of body that has since been standardized by many British passenger car makers and custom body builders), it has failed to fulfill the requirements of a number of potential buyers who, favoring the general idea of a close-coupled sedan on "sporting lines," have sought more roomy and comfortable accommodation for the passengers riding in the rear than the sportsman's coupe body afforded.

For that reason the Rover company has introduced, as an additional model, what is called the "sportsman's saloon," for the two-liter six-cylinder chassis. It embodies certain features of the coupe—for example, two wide doors giving easy access to both front and rear seating, recessed rear floor, separate and adjustable front seats and folding roof—but the body is longer and has a small window at each side of the rear seat. It has a more pronounced slope for the windshield, which is hinged at the top to open almost horizontally if required. To obviate the need for a sloping front edge for the winding windows in the doors there is a fixed front portion of the door windows, about 12 in. wide.

As the accompanying illustration shows, the slope of the windshield is reproduced in the reverse direction at the rear end of the lights alongside the rear seat, and corresponding inclination is given to the rear of the body superstructure and to the "tail" forming the bag gage locker. The latter overhangs beyond the chassis extremity, but the seating is all within the wheelbase. The new model has a more attractive appearance than the photograph suggests, the rear overhang being less evident and not at all displeasing to the eye.

The body is of the flexible fabric type, constructed on Weymann principles, and is offered in a range of four colors, viz., black, red, brown and blue. Detachable wire wheels are standard with a five-bolt fixing and a black finish, although these can be had without extra charge, at buyer's option, in cream, red or green.

Two renderings are offered, the Standard at £435 and the Regal at £474. The former has either cloth or leather upholstery covering and the latter either cloth or furniture hide.

Two suitcases fitting into the rear locker, bumpers, visor, vacuum servo braking, two spare wheels and tires are items of equipment included with the Regal type. Pneumatic front seat cushions are fitted to both models; the rear seats have armrests, loose pillow cushions for optional use in addition to fully sprung and heavily stuffed cushions and back squabs as in ordinary sedans. The instrument board is in walnut.

Chrome plating is standard throughout and beading thus finished runs in a straight line from the radiator to and around the rear of the body, around and over the windows and along the front edge of the roof.

The car complete weighs 3050 lb. and has an overall length of 174 in., the wheelbase being 118 in. and the track 56 in. The chassis is the standard Rover Six, the two-liter engine having a bore and a stroke of 65 mm. (approximately 2 9/16 by 4 in.)

It may be added that the folding roof, a feature that has proved to be greatly appreciated on Rover sedans and the sportsman's coupe, enables roughly three-quarters of the "head" to be thrown back in a few seconds on to the remaining fixed section, leaving only the normal crossbar of the windshield in front and above the line of vision ahead.

Indianapolis Rule Changes Were And Increase *Public Interest*,

New specifications were written trend toward higher road found in the design of

By VAL
Secretary, Contest Board,

Val Haresnape

IT is a difference of opinion that makes possible horse-racing, throws the political-minded into a fever heat and draws throngs to debates. Therefore, a difference of opinion with regard to automobile racing should likewise prove beneficial through aroused interest.

At the outset, one might ask, why were new specifications necessary for Indianapolis in 1930? If necessary, what alternate specifications were available to meet the demand for a change? With the single exception of the Indianapolis Speedway, present-day racing is unprofitable to anyone connected with it. Many of the cars are reaching a point of fatigue and the most careful diagnosis is without avail as far as determining when that point is reached. The manufacturers of passenger cars are not interested in racing. This is self-evident from the fact that none of them have built race cars since 1923, while their financial support, even in the most indirect way, has been almost nil. Change, then, was necessary and the way seemed open for a new union of public in the roaring road, as well as for factory support.

Now, as to the alternates: A new specialized racing car class of, say, 61 cu. in. could have been created. A race could have been instituted for absolutely stock cars. Or, for a sports type car such as has been raced at LeMans, Brooklands, Dublin, and on Aug. 17 in the Tourists Trophy Race at Ulster. These were the objections: American passenger cars were steadily decreased in piston displacement until two years ago, since which time the tendency has been unquestionably toward larger engines and higher ratio rear axles. All practical lessons as to high speed, large power output from small displacement engines, and so on, necessary for the use of engineers for years to come, have been learned from the 91-in. jobs. A stock car is by nature a compromise in the engineer's mind to meet a vast range of conditions. Unmodified, it is not suited to long continuous high speed. And since the birth of the industry, no group of people have ever agreed on what were fair modifications nor as to how to guarantee that no changes beyond these were actually made. American cars are so good that there is but a limited field for sports cars in this country. For the time being, these three suggestions were put aside.

The 1930 regulations as announced by the Indianapolis Speedway are calculated to definitely do three things: First, to result in a car with specifications—that is, weight, length, width and appearance—conforming to the cars that we see every day on our streets and highways. Second, to test parts and mechanisms of the same size which will obviate the deduction method by which race results have heretofore been translated into usability by engineers. It was believed that out of all available principles of explosive engine operation, the four-cycle principle had been farther developed and was understood more completely than any other. Therefore, in four-cycle plants only further experiment in complicated valve systems was restricted. Third, it was apparent that in the minds of the American factory engineers the high speed supercharger was not needed in connection with four-cycle operation. Six years had proved that. The supercharger by long odds took first place as the most expensive single gadget that could be applied to a race car. Hence the high-speed supercharger was denied.

An Authority Speaks

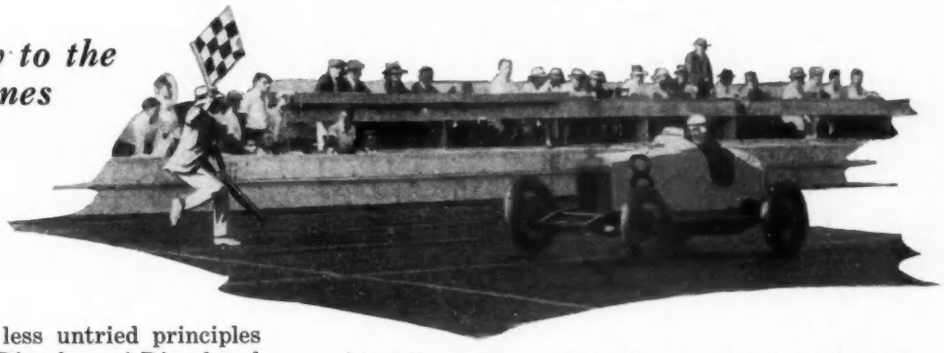
NO discussion of racing rules would be complete without an expression of opinion from Val Haresnape, secretary of the Contest Board of the A.A.A. His wide experience with racing and personal acquaintance with promoters, drivers, owners and racing fans enable him to speak of racing with authority.

Although he is taking "time out" from duty, under doctor's orders, he is so much interested in the arguments about the 1930 Indianapolis race that he has prepared the accompanying article at his home.

Made to Gain *Factory Support* Says *Contest Board* Secretary

to conform more closely to the speeds and larger engines modern passenger cars.

HARESNAPE
American Automobile Association



Val Haresnape, with the flag, at a board track race

Now, the other and more or less untried principles of engine operation—two-cycle, Diesel, semi-Diesel and turbine—are conceded to have vast and incalculable possibilities. No restrictions whatsoever were placed on the development of cars powered by engines with any of these characteristics. The development of a practical Diesel engine for passenger car operation alone would result in multiplication of the available fuel for motorists by 20 times, at a much lesser cost and without fire hazard. And racing, should it develop a practical Diesel motor powerplant, would make a contribution not only to motordom but to aviation.

The same is true regarding carburetion. Experimental four-cycle cars have used any number of carburetors up to one per cylinder. But normal passenger cars are not so equipped and not a single engineer could be found who believed that more than two (or dual) carburetors could be safely placed on the average public vehicle, due to the necessity for sensitive adjustment. But we do need more efficient employment of fuels mixed by the single or dual carburetors that are being used and further study of manifolding and correct mixing can be expected to give valuable result.

The regulations have resulted in intense argument. That, at least, shows that they are virile. Many objections, the public champion of whom has been Mr. Moskovics, are that there is no restriction against very expensive cars far beyond even the present cars in complications. Let us be practical.

We are not discussing the building of a mile straightaway car. The winning car that results from these specifications must travel 500 miles on a track with four corners in which speed is of its very nature physically restricted. Any of the 33 qualifying cars at Indianapolis this year could easily best Major Segrave's 231-mile Golden Arrow in a 500-mile race on the Indianapolis track. We have seen many examples of the expensively built car which seemed theoretically the last whisper but which never won a race. A car has competed at Indianapolis the last three years in which the eventual investment totaled finally this year $125,000. It was never a racing success. There is nothing to fear from this score.

There can be serious debate on the question of two-man crews and when and where they should be permitted. The Contest Board will probably prohibit the riding mechanic on races of 100 miles or under. It will also likely continue to prohibit the riding of a mechanic on steeply-banked tracks on which there is practically no restriction as to speed. But on tracks of a simulated road character, such as Indianapolis, the maximum speed is limited. Over long races, dangerous fatigue can possess a driver without observation. There has been only one fatal accident on this track in years. Probably as many accidents from not knowing of an overtaking car have occurred as from all other causes. The actual number of men exposed to physical injury will probably be the same—surely not more.

The mechanic can assist materially in team spirit, guard his driver against dangerous fatigue, assist in safe passage through dense traffic, read and interpret signals and many otherwise unnoticed incidents. He will be turned out a graduate of a school that will result again in a class of drivers of superior training.

The suggestion that American racing consider fuel limitation could not have had any serious thought or consideration. In formula racing the calculations that determine the winner must be made by experts after the contest proper is concluded. The results are available only through the press. Racing in America for years, and as far as we can see in the future, is dependent for its financial support on the gate receipts from the attending public. No sport in this country will succeed in which the tide of battle is not

Above is Val Haresnape, T. E. (Pop) Myers and Major Segrave, at Daytona Beach, when Segrave broke the world's speed record

constantly and clearly in evidence and in which the final and deciding result is not immediately and visually observed. It is possible that with strictly stock cars over a long period such as 12 or 24 hours, fuel allowance might be successful, letting the color and the pageantry of the occasion suffice to satisfy the public, with the dependence largely on factory financial support to defray the costs of the competition and the public's contribution merely divided between prizes to the drivers and profits to the promoter.

A departure such as this naturally results in discussion. My office has been a chief focal point for it. So far, it is all healthy and beneficial. Most of the critics are not hazarding a penny on racing. To them it is merely academic. Bear in mind that the Indianapolis Speedway is hazarding not less than the $150,000 actual cost of the annual "500" on the strength of their judgment, but likewise the potential earning of perhaps a quarter of a million dollars which they deserve on a fixed investment of better than a million dollars and an annual operating expense included the race of the same amount. Fortunately, it is quite clear that the new regulations will receive support. I personally look for not less than 75 worth-while American entries next year and the greatest number of foreign entries we have had since prior to the war. If this prediction proves true, then undoubtedly the choice of regulations had a high average of wisdom and selection.

INDIANAPOLIS MOTOR SPEEDWAY ASSOCIATION

Indianapolis, Ind.
Aug. 26, 1929.

Editor, *Automotive Industries:*

My statement that no man is quite so well qualified to take advantage of racing rules as Mr. Moskovics referred entirely to constructing racing cars under rules for the 1930 contest at Indianapolis. His long and varied experience in racing places him in a position to plan a car which complies with the rules but may be of unusual construction and very high speed.

I had no thought of suggesting anything about taking an "unfair" advantage of rules, and I regret that Mr. Moskovics should have misunderstood that part of my statement.

Very truly yours,

E. V. RICKENBACKER,
President, Indianapolis Motor Speedway Association.

Regulations Adopted

Final draft of regulations for next year's 500-mile International Sweepstakes, as given in the official entry blank, include several changes which have been made since publication of the preliminary copy of the rules in *Automotive Industries*, in the May 25 issue.

The first change makes it necessary that two-cycle engines must be equipped with mechanical starting devices and weight of the car including cooling water.

Second, in the naming of all cars, the following regulations will govern:

All names are subject to the approval of the Contest Board at the time of registration. The initial naming of a car must be made not later than the date of closing of entries of the first competition in which it is entered.

Cars may be named—

(a) After a manufacturer, provided the main components (that is, presumed to be the engine and transmission at least) are designed by said manufacturer. The intention is to permit factories to race either under the name of their product or incognito, as they prefer. If under their trademark name, the factory should at least design and have supervision during the construction of its car. Factories will not be permitted to race a product as their own in the case of cars purchased already constructed. All disputed cars are to be referred to the National Technical Committee of the Contest Board who as a committee of the whole will hear the evidence pro and con and their decision will be final;

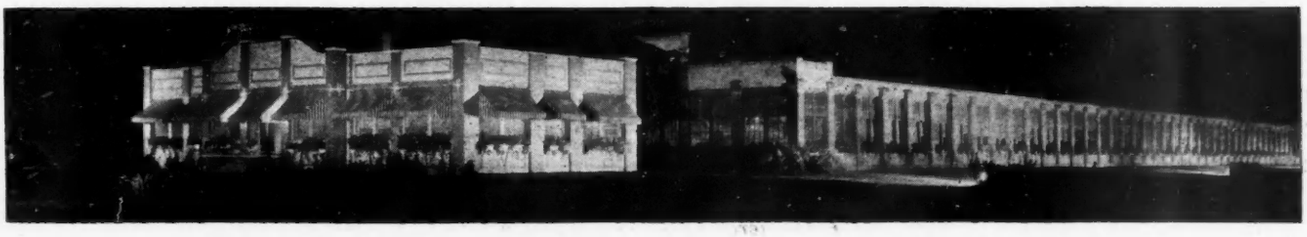
(b) After the owner or owner-driver. This is to permit any race car to be named after its bona fide owner;

(c) After a recognized accessory in national use and upon regular sale. Provided that the accessory designated must be actually used in its regular way in or upon the car.

Renaming Cars Restricted

Names Prohibited—A car may not be named after a manufacturer by others unless the written consent of the manufacturer concerned is filed with the Contest Board on or before the first application for registration, nor is a car to be permitted to resemble the product of any American manufacturer without such written consent. This regulation applies particularly to radiator, hood, hub caps and other individual characteristics.

No change in name after the initial christening may be made without first obtaining approval of the Contest Board. In general, cars named for a manufacturer or an accessory will be required to be altered substantially in appearance. In no case will they be permitted to be named for a second manufacturer. They may be permitted to be named for a second accessory provided there is a bona fide sale and the new accessory is actually used, as in the first instance. There is no intention to restrict the renaming of cars after new private owners. In all cases notice must be given the Contest Board not less than 30 days prior to the authorized use of the new name even where permission is granted.



The Battle Creek, Mich., plant of the Clark Equipment Co., illuminated with floodlights

Lycoming Develops Aero Engine of Radial Type in Two Models

Nine-cylinder powerplant, with piston displacement of 645 cu. in. and rated at 185 hp. at 2000 r.p.m., and seven-cylinder type of 500 cu. in. announced.

THE Lycoming Model R-645 is the first of the series of aviation powerplants developed by the Lycoming Manufacturing Company of Williamsport, Pennsylvania.

This engine is a nine-cylinder radial with a piston displacement of 645 cu. in. The rated power output, as approved by the Department of Commerce in its A.T.C. No. 27, is 185 hp. at 2000 r.p.m. The weight of the engine dry is approximately 465 lb. or 2.5 lb. per rated brake horsepower. The engine is supplied complete with exhaust manifolds, shutters, nose cowling, etc. Reliability has been the prime consideration in this design and a high factor of safety has been used throughout.

Besides the nine-cylinder model, a seven-cylinder engine of 500 cu. in. displacement has been developed, identical in detail design with the larger engine.

These two engines, as approved for production, were presented for the first time at the International Aeronautical Exposition in Cleveland during the National Air Races.

The appearance of the engine is conventional. The exhaust manifold is mounted between the propeller and the cylinders and to improve cooling, is streamlined. Ventilation has been provided between the manifold and the crankcase to avoid undue heating of the engine. Between the exhaust manifold and the crankcase is interposed the nose cowling with its shutters arranged to permit engine temperature control from the pilot's cockpit.

The cylinders are finished with black enamel and all external aluminum surfaces are given a coating of enamel to protect them from corrosion. All exposed steel parts are given a rust-proofing treatment.

The design of the cylinder construction follows conventional lines. The cast aluminum alloy cylinder head is screwed and shrunk on a machined carbon steel barrel. To improve the heat transfer between head and barrel, and for additional strength at this point, an alloy steel ring is shrunk over the threaded portion of the head. Furthermore, this joint is made proof against leakage by a copper gasket. The cylinder barrels are made from pierced and expanded forgings, improving the flow lines.

The valves are spread 30 deg. from the center line of the cylinder and face the air stream to procure adequate cooling of the valve seats. The valve seats differ from standard practice in that they are made from "CNS" steel. This material is thought to be superior in such localities where lead compounded fuels are commonly used. Due to the higher coefficient of expansion of this material, the method of their retention eliminates the spinning operation. The intake valves of Tungsten steel have a solid stem with a practically flat head. The exhaust valves of "CNS" steel have a hollow stem with a tulip-shaped head.

The valve operating mechanism is of conventional design. The cams on the nine-cylinder engine have four lobes running at 1/8 engine speed, and the seven-cylinder engine three lobes running at 1/6 engine speed. An extensive study of cam contour has been made to get valve accelerating values commensurate with the spring pressure increments. The cams, cam drive gears, cam followers, etc., are located in the forward part of the crankcase.

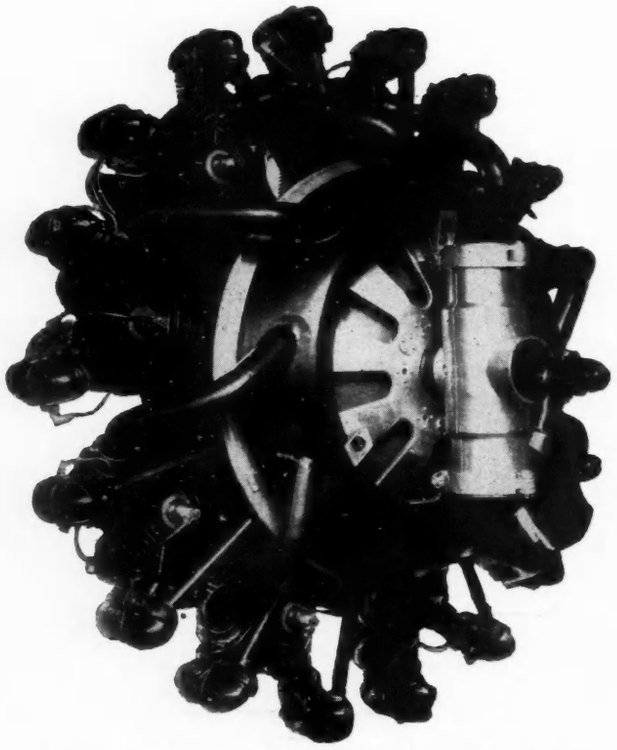
Photograph of Lycoming Model R-645 aero engine, showing arrangement of accessories

Pushrods, rocker bearings and rockers are totally enclosed, but the valve springs are exposed in order to prevent oil from collecting on the valve stems, to aid valve cooling and also to eliminate the corrosive effect of the exhaust gases. Two round wire springs, helically wound in the same direction, are used per valve, and have been developed to be free entirely from harmful periods at any speed within the operating range.

The rockers run on plain bearings, and are lubricated by a centralized system wholly incorporated in the engine design and operated from the pilot's cockpit, which greatly simplifies lubrication. A central pump forces the

lubricant through drilled passages in the engine and distributes an equal amount through metering jets to each rocker. The weight of the whole system, exclusive of tank, is approximately ¾ lb.

A great deal of detail work on two-piece crankshaft design has led to the final adoption of a clamped type shaft. The clamp proportions have been selected so that the tightening of the bolt will neutralize such stresses as are produced by the forcing of the clamped end over the crank pin. The shaft is counterweighted in conventional proportions and the counterweights are forged integral with the shaft. A forging technique has been developed that gives practically ideal distribution of flow lines. The shaft, which is machined all over, is statically and dynamically balanced. To improve the impact resistance of the shaft,



Front view of Lycoming aero engine, with exhaust collector ring attached

the material selected for the crankshaft is a chromium nickel steel of slightly higher chromium content than is commonly used. The maximum stress in the shaft has been kept below 14,500 lb. under normal working conditions.

The master rod is made from the same material and is also machined all over. The stresses on the rod have been reduced by more than one-half of that which would give an indefinite fatigue life. Steel-backed babbitt bearings are pressed into the rod and oil is distributed to the bearings and to the link pins from grooves in the rod.

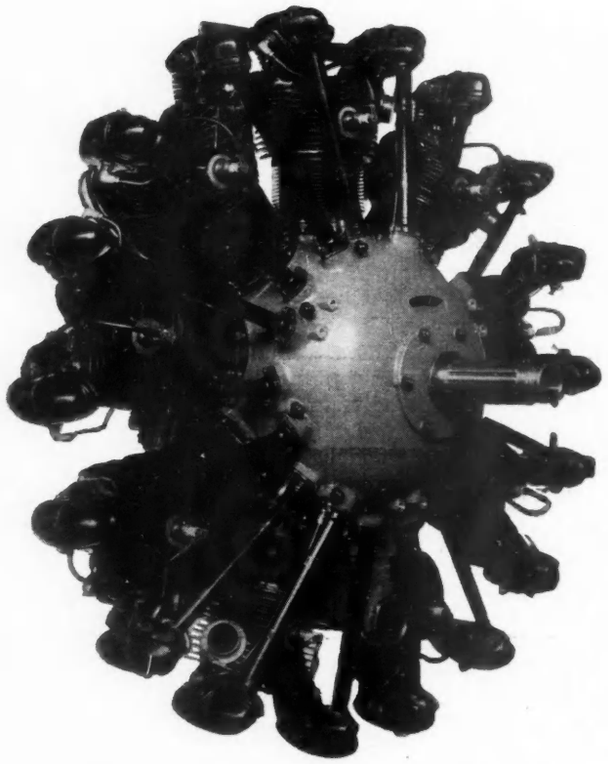
In the design of the link rods, a forged aluminum alloy similar to that used in propeller blades was chosen. The billet is machined all over before forging, and after heat-treatment the rods are subjected to etching and polishing processes to detect any forging or other material defects. By the elimination of the complete machining, it is possible to make the rods equally strong in both directions, and a very advantageous shape is produced.

Bushings in the ends of the rods have been eliminated and the aluminum bears directly on nitrided wrist and link pins. The nitrided pins have an extremely hard and glazed surface and provide an excellent surface for the rod bearing.

Aluminum alloy permanent mold cast pistons are used. The piston design incorporates an extensive system of ribbing on the under side of the head to provide adequate cooling and particular care has been given to the rigidity of the pin bosses as well as to the piston as a whole. Three rings are used above the piston pin, and one below. The piston pins are retained by aluminum plugs in the ends.

To secure proper fuel mixture distribution, a rotary induction system is used. It was felt that the elimination of delicate gear trains and extreme high speed rotary parts was desirable for this type of engine, and an engine speed impeller of rather large diameter has been employed. The free flow areas throughout the induction system have been kept constant, and a satisfactory distribution at all speeds, as well as good accelerating qualities result.

The carburetor supplied is a Stromberg NA-R7 with a single venturi. This type of carburetor is provided with a manually-operated altitude adjustment acting somewhat similar to an economizer.



Front of engine pictured without exhaust ring

A departure from the usual ignition equipment on engines of this size is the dual Scintilla magneto with two independent distributors. Two entirely separate electrical circuits are thus available, each firing one plug per cylinder. The magneto and distributors can be replaced by a generator and breaker unit, should a battery-type ignition system be desired on larger types of planes, where a battery is also used for other purposes; this replacement is effected without any change in the basic engine construction. The whole of the ignition system can be shielded easily for radio interference, should it be desirable.

Lycoming Aero Engine Specifications

Model R-645

185 Brake Horsepower at 2000 r.p.m.

General Form:
- Bore—4½ in.
- Stroke—4½ in.
- Number of cylinders—9.
- Total piston displacement—644 cu. in.
- Rated r.p.m.—2000.
- Cylinder arrangement—Static radial.
- Cooling—Air.
- Compression volume ratio—5.1 to 1.

Performance:
- Brake horsepower, guaranteed—185 at 2000 r.p.m.
- Specific fuel consumption, guaranteed, 0.55 lb. b.hp.h.
- Specific oil consumption, guaranteed, 0.035 lb. b.hp.h.

Pistons—Aluminum alloy, ribbed, 4 rings.
Cylinders—Aluminum head forged steel barrel.
Valve Seats—"CNS" steel, shrunk in.

Valves:
- Number per cylinder—2.
- Form—Intake flat, exhaust tulip.
- Clear gas flow area—Intake 2.06, exhaust 1.99.
- Seat angle—45 deg.
- Lift—29/64 in.

Ignition—1 Scintilla magneto, 2 Scintilla distributors.
Starter—Optional.

Carburetor—NA-R7, Stromberg, single barrel.
- Altitude control means—Auxiliary needle valve.

Lubricating Systems:
- Pressure in pounds—45 to 60.
- Oil pumps—2 suction, 1 pressure.

Overall Dimensions:
- Overall length—33 9/16 in. (without starter).
- Overall diameter—42⅜ in.
- Weight, dry—465 lb.

Crankshaft:
- Overall length—21¼ in.
- Journal diameter—2.756 in.
- Crankpin diameter—2 1/16 in.

Number of Bearings—3.
Propeller Hub—S.A.E. Standard No. 20 splined.

Connecting Rods:
- Length, center to center—9⅞ master, 7⅞ link.
- Type—Solid H section.
- Wrist pin retaining device—Full floating with Dural plugs.

Valve Springs—2 Helical.
Valve Timing Adjustment—Remeshing of gears.
Crankcase—Cast, one piece.
Fuel Pump—Type C-5.
Ratio of crankshaft speed to pump speed—1 to 1½.

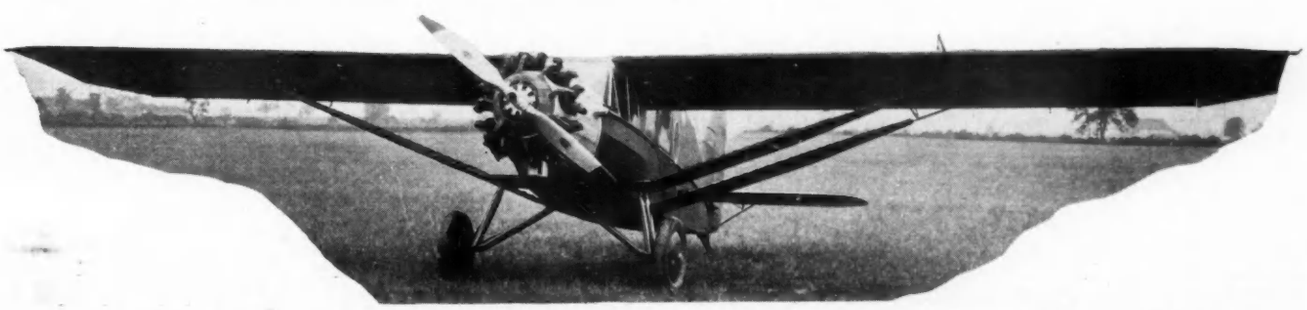
The rear carries a standard starter drive operating directly on an extension of the crankshaft. A mounting for a standard fuel pump is provided on one side driven by helical gears. A tachometer drive pointing directly toward the rear and conforming to standard dimensions is also incorporated. These units are easily accessible when the engine is installed in the plane and their design is such that they can be withdrawn, together with their gears, for examination.

The lubricating system is conventional in that one pressure pump supplies the whole engine through drilled passages. The crankshaft and one of the accessory driveshafts are used for the main distributing means. In laying out the lubricating system particular attention has been given to oil lines, and piping has been eliminated completely, all oil being conveyed through drilled passages. The only plumbing necessary will be that joining the engine and the oil tank. Two scavenging pumps keep the front and the rear end dry. They discharge the oil into passages around the intake system to eliminate condensation of the fuel on the walls of the impeller housing, and also condensation of moisture in the rear end of the engine. In doing this, the oil gives up some of its heat and the need for external oil coolers has been eliminated. Oil pressure can be regulated properly and it has been found that 45 to 60 lb. per sq. in. is sufficient for the operation of the engine. The oil pumps are removable as a unit for service and inspection.

The engines were designed by Val Cronstedt, who has charge of the aero engineering activities of the company, under the direction of E. D. Herrick, chief engineer. A separate unit entirely apart from the other engine activities of Lycoming is used for the production of aviation engines.

Bellanca Cabin Plane Entered in Air Races

BELLANCA Aircraft Corp. of New Castle, Del., entered an entirely new cabin monoplane in the National Air Races which were held this week at Cleveland. The major changes from the CH300 model, upon which the design of the new Pacemaker is built, are chiefly in the landing gear and flying controls. The plane carries 5 passengers in addition to the pilot, with a total loaded weight of 4610 lb. The gasoline capacity is 85 gal, and oil, 7 gal. It has a top speed of 145 m.p.h., cruising speed of 122 m.p.h. and a service ceiling of 19,000 ft. It is powered by a 300 hp. Wright Whirlwind J-6 engine.



Above is shown the new Bellanca five-passenger cabin monoplane—the Pacemaker—which was entered in the National Air Races held in Cleveland this week

Transmission and Worm Gear of Are Combined in *Single Unit*

All universal joints used are of the Weiss constant velocity type, the one at the knuckle end permitting an angularity of more than 32 degrees.

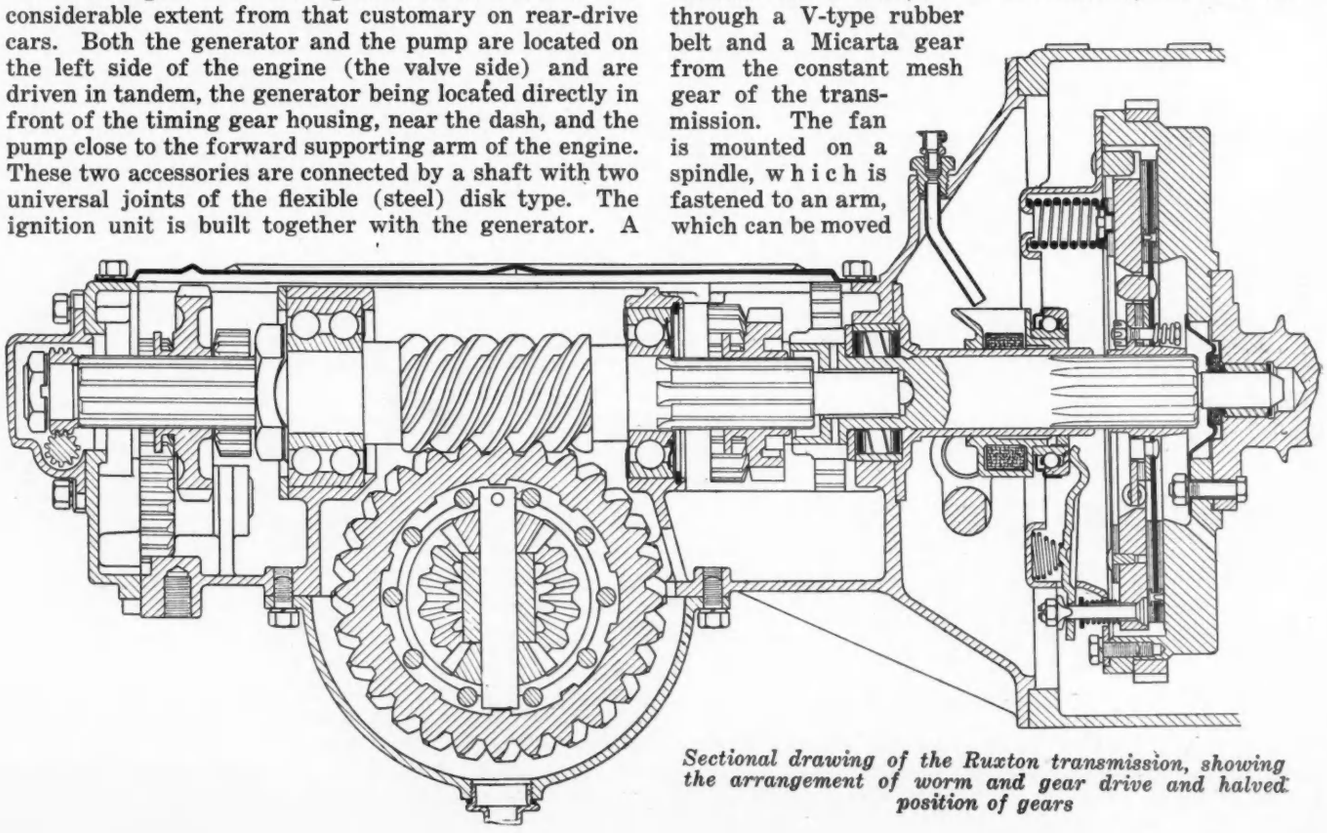
By P. M. HELDT

SINCE the first description of the Ruxton front-drive car appeared in *Automotive Industries* of June 1, the regular production models, which incorporate a number of important improvements, have been completed. Moreover, sectional views of components of this car are now available for the first time, hence we present herewith additional details of the car, relating chiefly to transmission and drive features. All of the principal specifications remain unaltered and may be found in the article above referred to.

It may be recalled that the engine of the Ruxton is an eight-cylinder-in-line type of Continental manufacture, which is set on the frame with the flywheel bell housing forward. It has a 3-in. bore and a 4¾-in. stroke, and develops in the neighborhood of 100 hp. It is supported on the frame at four points, the supports at the front being rigid and those at the rear through rubber cushions.

The arrangement of the engine accessories differs to a considerable extent from that customary on rear-drive cars. Both the generator and the pump are located on the left side of the engine (the valve side) and are driven in tandem, the generator being located directly in front of the timing gear housing, near the dash, and the pump close to the forward supporting arm of the engine. These two accessories are connected by a shaft with two universal joints of the flexible (steel) disk type. The ignition unit is built together with the generator. A Zenith dual carburetor of 1¼-in. size is used, together with an exhaust-heated manifold with provision for heat control. The exhaust down-take is at the forward end, and the muffler is located alongside the crankcase below a filler plate, between the crankcase and the frame side rail. This location of the muffler permits of placing it on approximately the same level as the frame side rail, whereas if it were placed farther to the rear, owing to the closely spaced frame cross-members, it would have to be placed lower than the frame and therefore reduce the road clearance. The muffler tail pipe extends back close to the rear axle.

Arranging most of the accessories on the valve side of the engine leaves the opposite side clear, except for the starter, and this side is used for the battery, which is thus located under the engine hood, where it is more accessible than in the position under the front floor board, usual in the conventional car. A four-bladed radiator fan is used, 17 in. in diameter, and is driven through a V-type rubber belt and a Micarta gear from the constant mesh gear of the transmission. The fan is mounted on a spindle, which is fastened to an arm, which can be moved



Sectional drawing of the Ruxton transmission, showing the arrangement of worm and gear drive and halved position of gears

Ruxton *Front-Wheel* Drive Car

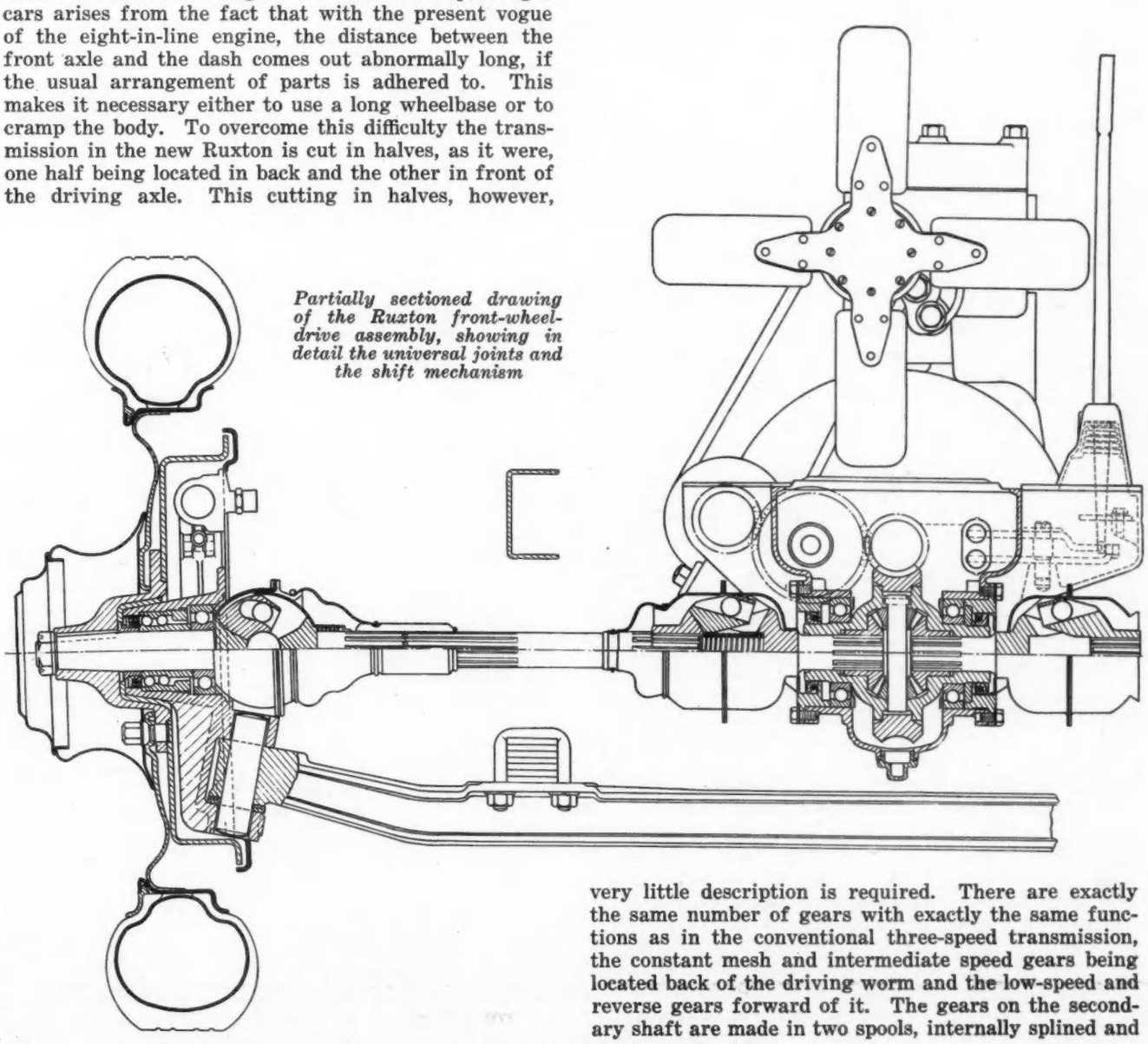
on a bracket on the flywheel housing, for adjustment of the belt tension.

The radiator is of Long manufacture. It has a plane core and a rounded dummy front, giving streamline effect. This dummy front is of such design that it restricts air flow through the radiator very little. Set on top of the transmission case, the radiator is not quite as high as in the usual rear-drive car, but sufficient cooling capacity is obtained by using a wide and deep core, the depth being 4 in. Other engine accessories include an AC fuel pump, an Air-Maize air cleaner and a Purolator oil filter.

The most notable change which has been made in the design since the previous description appeared is in connection with the transmission. One of the problems that confronts the designer of front-drive passenger cars arises from the fact that with the present vogue of the eight-in-line engine, the distance between the front axle and the dash comes out abnormally long, if the usual arrangement of parts is adhered to. This makes it necessary either to use a long wheelbase or to cramp the body. To overcome this difficulty the transmission in the new Ruxton is cut in halves, as it were, one half being located in back and the other in front of the driving axle. This cutting in halves, however, applies only to the gears and not to the transmission as an assembly. From the standpoint of assemblies, the arrangement adopted may be better described by saying that the transmission and final drive have been combined in a single unit, the worm of the final drive being part of the splined shaft and having some of the change-speed gears on each side of it.

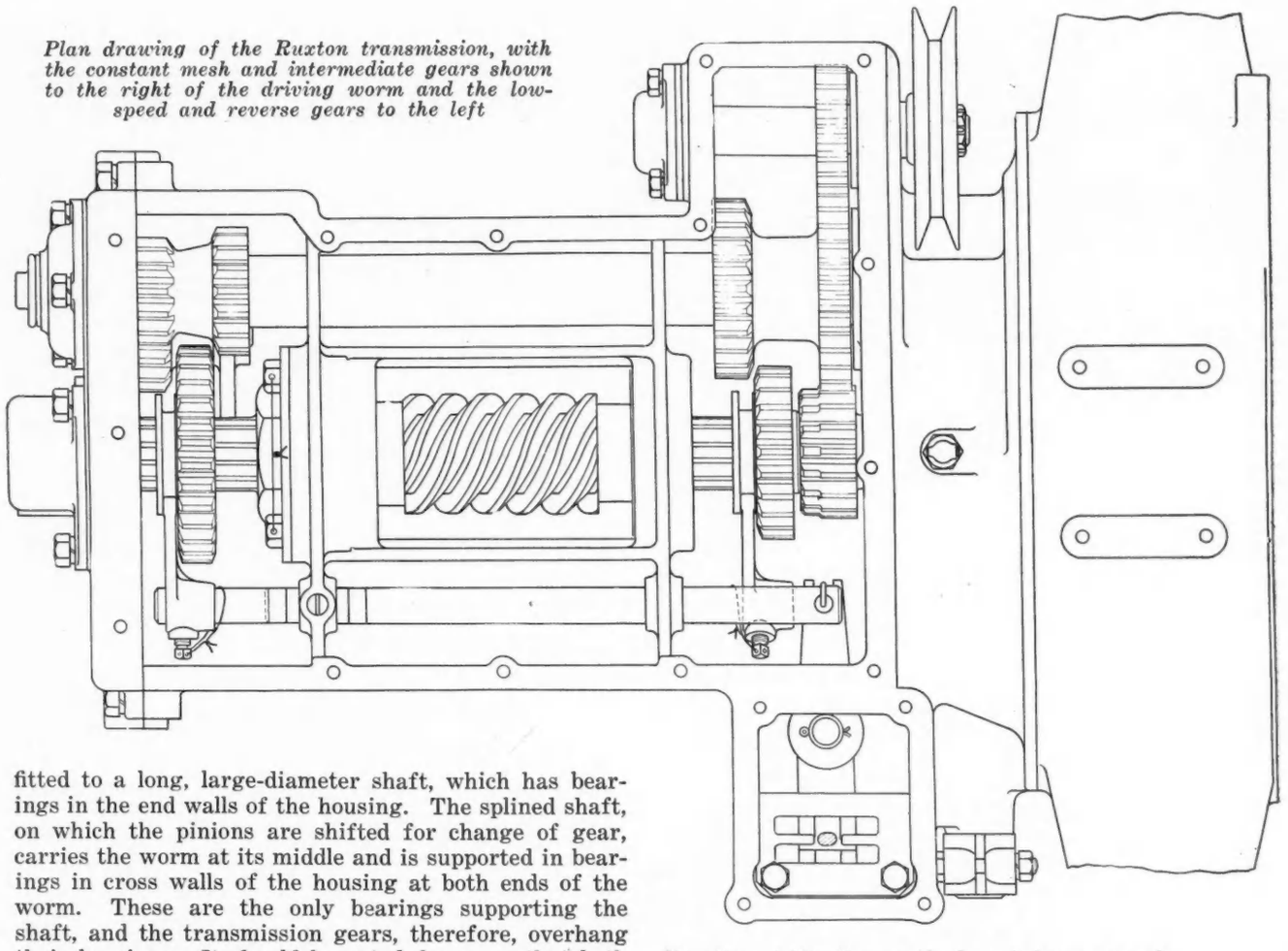
The arrangement is shown in plan and in vertical section herewith. There is one other difference between the Ruxton and the conventional passenger car transmission, and that is, that the two parallel shafts are located side by side, instead of one above the other. The reason for this is obvious, as there is no room for the secondary below the primary shaft.

So far as the gearing of the transmission is concerned, very little description is required. There are exactly the same number of gears with exactly the same functions as in the conventional three-speed transmission, the constant mesh and intermediate speed gears being located back of the driving worm and the low-speed and reverse gears forward of it. The gears on the secondary shaft are made in two spools, internally splined and



Partially sectioned drawing of the Ruxton front-wheel-drive assembly, showing in detail the universal joints and the shift mechanism

Plan drawing of the Ruxton transmission, with the constant mesh and intermediate gears shown to the right of the driving worm and the low-speed and reverse gears to the left



fitted to a long, large-diameter shaft, which has bearings in the end walls of the housing. The splined shaft, on which the pinions are shifted for change of gear, carries the worm at its middle and is supported in bearings in cross walls of the housing at both ends of the worm. These are the only bearings supporting the shaft, and the transmission gears, therefore, overhang their bearings. It should be noted, however, that both the intermediate and the low-speed gears are located almost directly adjacent to their bearings when in mesh.

With the two transmission shafts located side by side, the housing is comparatively shallow. Very rigid supports for the bearings of the worm shaft are obtained by tying together the cross walls of the case in which they are mounted, the walls running parallel with the worm. As may be seen from the plan view of the transmission, each sliding pinion is controlled by a slider bar, which at the rear end of the transmission is engaged by a double-armed lever extending into a control pocket at the side of the transmission housing. The arrangement of the shift mechanism is plainly shown in the drawing of the front axle. It will be seen that the two slider bars are arranged one above the other. Each slider bar at its rear end connects with a double-armed lever, these levers also being located one above the other and mounted on a common fulcrum pin. The outer ends of these double-armed levers are brought to the same level and provided with a slot each, into which the lower end of the shift lever may engage. This lever has a ball-and-socket support in a pedestal formed on the cover of the control housing, and works in a plate steel guide with an H-slot.

The shift lever on the transmission connects by a ball-type connector with a short lever at the forward end of a rod extending lengthwise over the engine and passing through the dash. Back of the dash this rod is fitted with a short upward lever with ball knob, by means of which the gears are shifted. A swinging transverse motion of the operating lever on the dash causes the shift lever to engage with one or the other of the sliding pinions, and straight-line motion in the fore and aft direction shifts the particular pinion engaged.

The most interesting part of any front-drive car is, naturally, the front axle assembly, and this assembly of the Ruxton car is illustrated by one of the drawings reproduced. The carrying member of the front axle is of I-section and is very similar in form to that of a conventional car, except in respect to two points. It is curved forward at the center of the car to avoid the differential drive housing, and the axle ends, which are of what is usually referred to as the reversed Elliott type, instead of being at the level of the wheel hub, are about 4 in. lower.

As may be seen from the drawing, the housing for the worm-drive gears is split horizontally through the axis of the gear, the upper half of the worm gear and differential being contained in what is really the transmission housing, and the lower half in a separate housing of cylindrical form. The differential is mounted in two large annular ball bearings between the two parts of the housing. It is of the two-pinion, single-piece housing type. Each of its side gears is spline-mounted on a shaft which is formed integral with one member of a universal joint. All of the universal joints used in the drive are of the Weiss constant velocity type. The two close to the differential have very little work to perform, as under normal spring deflection the drive is practically in a straight line, and the front springs, of course, have only a limited range of action. A single joint is used also at the knuckle end, and this is of special design with curved ball grooves, permitting of an angularity of more than 32 deg. The center of this outer universal joint lies in the knuckle pivot axis. There is, of course, a slight variation in the distance between the wheel and the center housing with spring

action, but this is very small and is taken up in the universal joints themselves. The outer member of the universal joint at the driving wheel also is formed integral with its shaft.

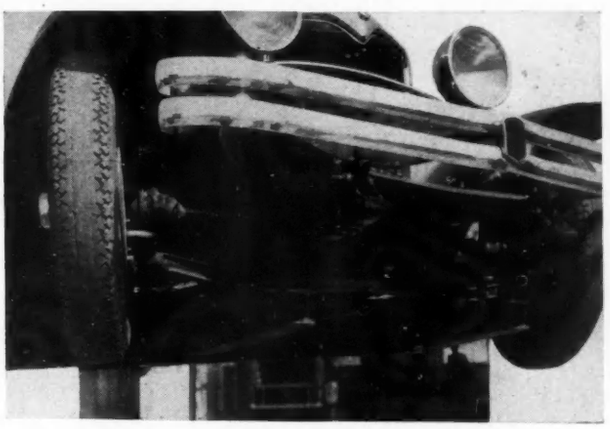
The steering knuckle of the Ruxton is a part of rather unusual form. In accordance with the usual practice to use high-grade alloy steel for this part, it is made of chrome-molybdenum steel. Where the ordinary knuckle comprises a spindle on which the front wheel revolves, this knuckle has a bearing shell supporting ball bearings in which the driving spindle is mounted. This spindle extends beyond the shell at its outer end, and has the hub of the driving wheel keyed to it on a taper. A yoke formed on the lower side of the bearing shell spans the boss at the end of the axle and serves to pivot the knuckle to the axle center. In addition the knuckle serves one other function, and that is as a support for the front-wheel brake back-up plate, to which end it is provided with a flange at the inner end of the bearing shell to which this plate is riveted. It will be noticed that the knuckle pivot is inclined so that its axis meets the ground near the center of tire contact.

There is one obvious advantage in having the knuckle-pivot bearings below the wheel center, and that is that in case of a lateral shock to the wheel, as in side skidding, collision with a curb, etc., the resulting momentum is considerably reduced, hence for a given force of impact the additional load on the bearings is less. The steering tie rod lies directly behind the axle center and is therefore fully protected by it against injury.

Wheels are of the Budd disk type and are provided with large chromium-plated hub shells and caps.

The rear axle is now made of heavy-walled carbon-steel tubing, for greater rigidity. It is a cranked axle, with a central straight tubular part of 2¼-in. outside diameter and ¼-in. wall thickness, to which are secured by riveting the cranked axle ends which comprise the wheel spindles. These are drop-forged of molybdenum steel. The drop of the axle center with respect to the wheel spindles is 2 11/16 in.

A rigid frame with numerous cross-members is used. The side rails are 6 in. high and have flanges 2 in. wide, 5/32 stock being used. At the extreme forward end there is a tubular cross-member; next comes the engine bell housing which also acts as cross-member. Back of the engine there are six more pressed steel cross-members, including the wide, apron-type member over the fuel tank, to which the brackets for the trunk rack are secured. One reason for the large number of cross-members is that the seats are supported directly by these members. The fuel tank is of comparatively flat form, to insure plenty of clearance under it in spite of the low frame height. It is made of two terne-plate stampings which are joined together by folding over, spot-welding and soldering.



View of front spring suspension of Ruxton car, showing apron shielding housing, which does not extend beyond the radiator

Half-elliptic springs are used all around, both the front and the rear springs being inclined toward the axis of the chassis. Rear springs are shackled at their rear and front springs at their front ends. Thus the drive is transmitted from the front axle to the frame in the form of a pull on the front-spring master leaf, while front wheel brake action is transmitted to the frame as a push on this leaf. Spring shackles are metallic, and the inner shackle of each pair is of the laminated spring type which tends to prevent looseness and rattling.

The engine hood is of unique design. Its sides are separate from the top and are held in place by brackets riveted to them along their lower edge, and spring latch bolts at their sides near the top. The top part of the hood is hinged as usual and is secured to the side members by hood catches of a special design. For certain simple operations, such as replenishing the crankcase oil supply, it is not necessary to remove the side of the hood but merely to raise half of the top.

Much of the sheet metal work on the car is quite out of the ordinary. Thus the radiator shell is formed with large depressions in the sides which are finished in the same color as the body, while the raised portion is chromium-plated. The radiator filler cap is sunk entirely below the level of the radiator shell and is secured in place by a sort of bayonet joint which requires only a slight angular motion to lock or loosen it.

The service brakes are Lockheed hydraulic brakes and act on all four wheels. The shoes in the rear wheel drums can be applied independently by a mechanical linkage for emergency purposes, by means of a lever located at the left of the driver's seat.

The steering gear is a Gemmer, of the worm and roller type. Steering stops are formed on the axxle center and the knuckles to limit the deflection of the wheels. These stops permit a maximum deflection from the central position of 32 deg., and this gives a turning radius of 19 ft.

A feature of the body worth noting is that the rear quarter windows are hinged for ventilation. Owing to their location directly over the wheel houses, it is impossible to open these windows by lowering them. On the Ruxton, these windows are hinged in front and have a catch on their rear side which locks them in both the closed and the open position.

Photograph of the Ford Airport at Dearborn

Improved Cierva Autogiro Tested In Flight *by Inventor*

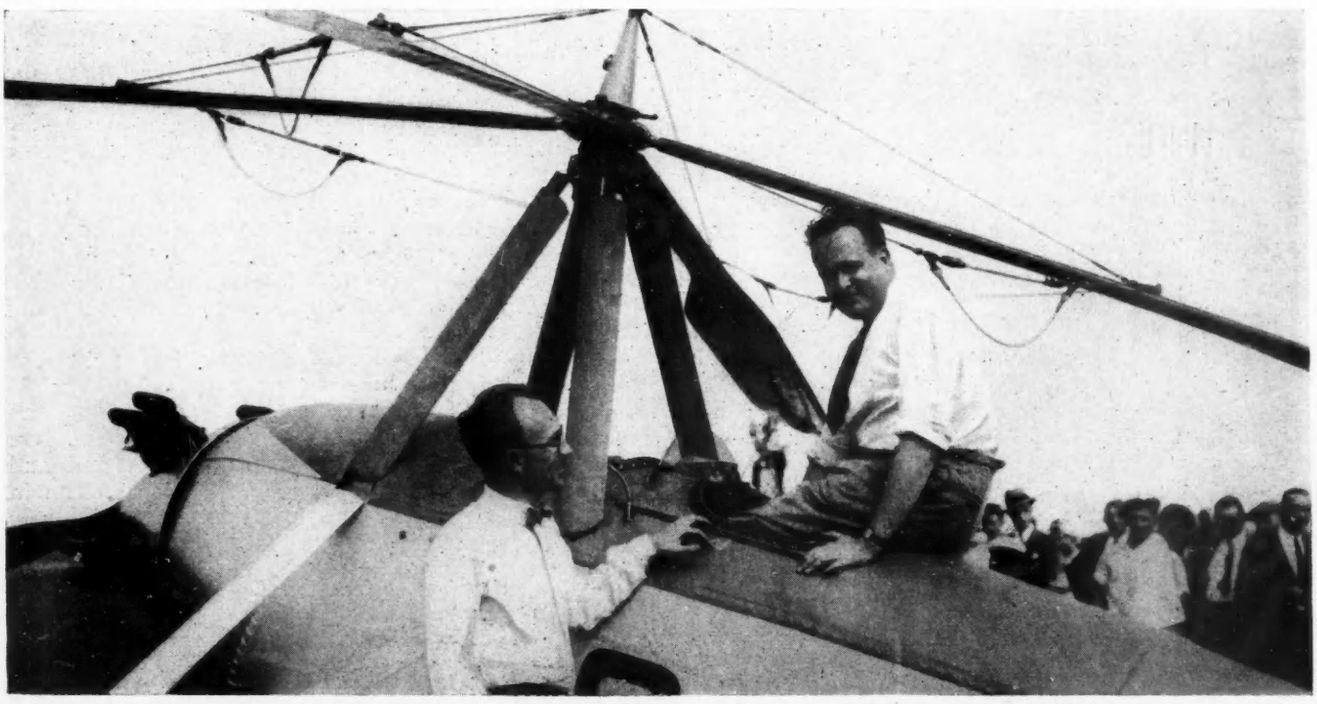
New tail structure, consisting of conventional elevator with a second fixed horizontal plane below it, has been added to model originally tried in England.

By HERBERT HOSKING

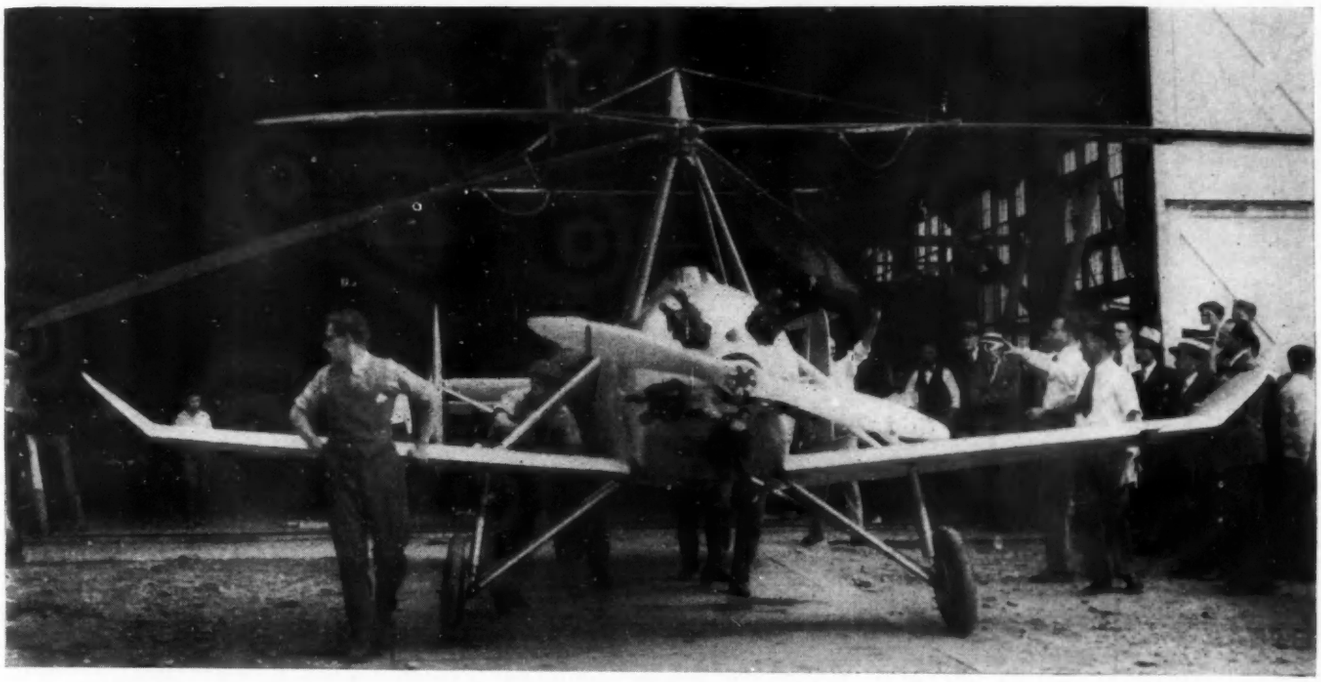
AN improved Cierva Autogiro, Mark G-AAKY, received its first flight test over American soil at the factory of Pitcairn Aviation, Inc., Bryn Athyn, Pa., Thursday afternoon, Aug. 22. Four successful short flights were made with the inventor, Señor Juan de la Cierva, Spanish engineer and member of Parliament, at the controls.

The plane had been flown for 10 minutes previously at the Southampton, England, factory of the A. V. Roe Co., where it was built, and had then been disassembled, crated and shipped to the United States by the S.S. "Majestic" in order to arrive in time to be entered in the Cleveland Air Races, the reliability tour for the Edsel Ford trophy, and other outstanding contests in this country. According to the inventor and Harold F. Pitcairn, president of Pitcairn-Cierva Autogiro, Inc., American sponsors of the plane, it is possible that modifications of the present structure may take place before the plane is entered in any contest.

At the time of the initial test, the present plane represented the matured result of nine years of effort on the part of Señor de la Cierva and collaborating engineers of four countries. Its general appearance is that of a conventional low-wing monoplane, the outstanding difference being the addition of a horizontal rotor with four 15-ft. blades, mounted on a vertical shaft over the forward cockpit of the plane. The raised center of gravity resulting from the addition of the rotor and shaft is compensated by dihedral wing tips with a pitch of approximately 135 deg. The wing span is about



Harold F. Pitcairn, president of Pitcairn Aviation, Inc., and Juan de la Cierva (in cockpit), inventor of the Autogiro, photographed at the first American test of the improved model. Structure and location of horizontal rotor are plainly shown in the above view



The Cierva Autogiro, as it came from the assembly plant of Pitcairn Aviation for its first American test, is pictured above

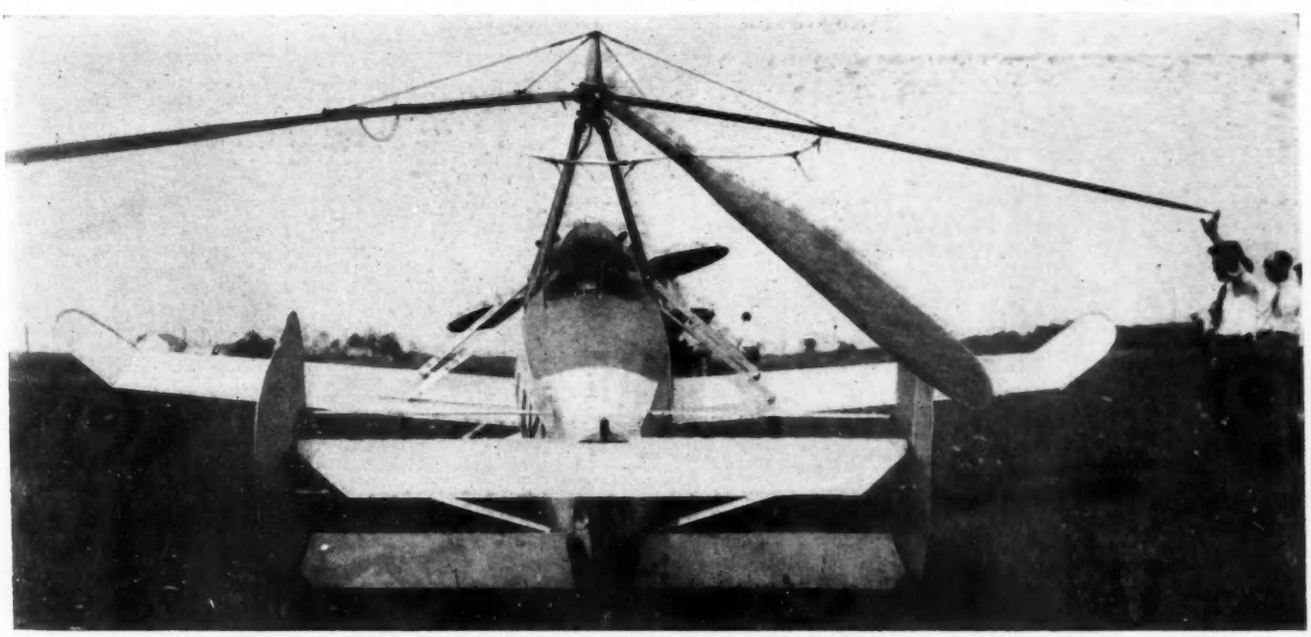
25 ft., so that the tips of the rotor blades extend beyond the wings.

The fuselage is of conventional design, but has been shortened in the test plane to 15 ft. The tail structure is new with the present plane, and consists of a conventional elevator controlled from the stick, and a second fixed horizontal plane below the elevator and to the front. This is ordinarily fixed at the beginning of a flight, but for experimental purposes is adjustable in flight from an auxiliary stick located beneath the pilot's seat. There are two vertical stabilizers and two rudders.

The plane demonstrated was powered with an Armstrong-Siddeley "Genet" engine of 100 hp., a five-cylinder radial type, fitted with a 7-ft. metal propeller. Wheel brakes are an almost necessary part of the operating equipment. Controls are dual, and the instruments those usually found with the addition of a tachometer attached to the horizontal rotor.

As Señor de la Cierva explained at the conclusion of his test flights, the horizontal rotor is set in motion and actuated by the propeller slip-stream being diverted by the horizontal plane of fixed pitch at the tail structure. This is supplemented and controlled by the ele-

(Continued on page 306)



Above is shown a closeup of the tail structure of the Cierva Autogiro. Note dual rudder and fixed horizontal plane, which is the lower of the two

Atterbury Marathon *Six* Trucks Have *Variety* of *Wheelbases*

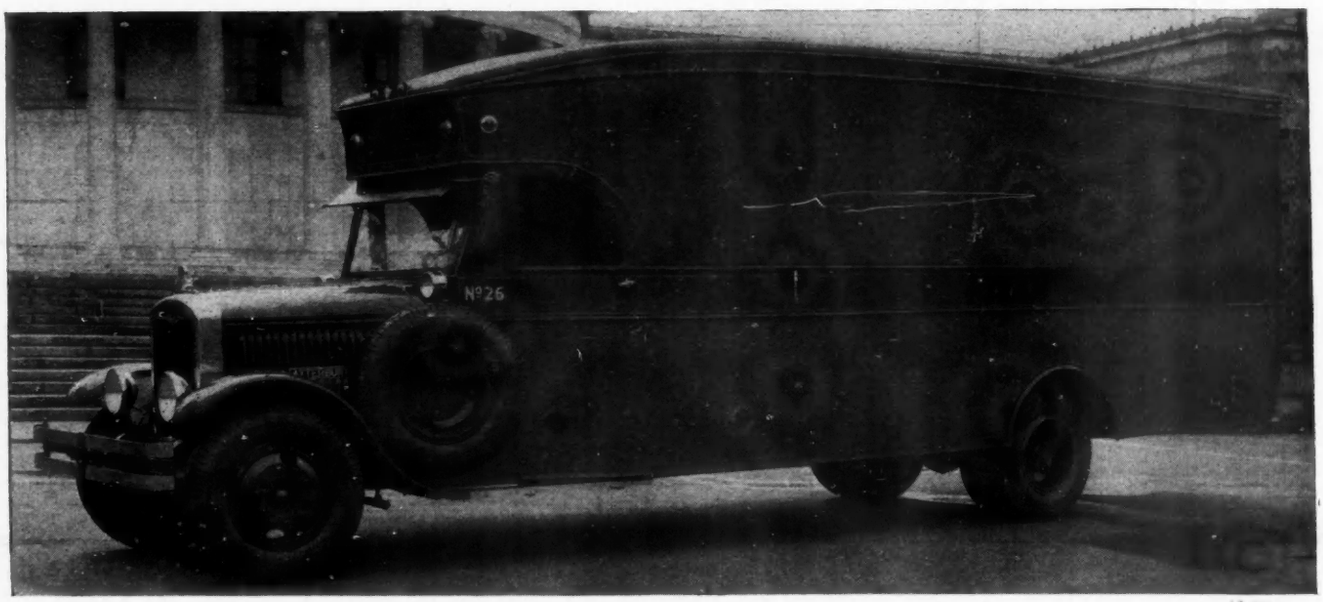
Five options are offered in 2½ and 3-ton models, and seven in the 4-ton, the range extending from 153 to 232 in. New lines and long, low chassis feature design.

NEW lines beginning at the radiator and carrying through a narrow, high hood, with horizontal louvers, coupe type cab, and long, low chassis feature the new series of Atterbury trucks, recently announced, in 2½, 3 and 4-ton capacities. These new models, known as the Atterbury Marathon Sixes, are offered in a variety of wheelbases, the first two models

(Continued on page 308)

Atterbury Marathon Six Specifications

Model	H-6	R-6	B-6
Capacity	2½ tons	3 tons	4 tons
Chassis weight	6550 lb.	6925 lb.	8000 lb.
Wheelbase, standard	164 in.	164 in.	174 in.
optional	153, 159, 173, 185, 199	153, 159, 173, 185, 199	154, 160, 166, 186, 200, 220, 232
Tires, front	32 x 6	34 x 7	36 x 8
rear	32 x 6 dual	34 x 7 dual	36 x 8 dual
Engine, make and model	Cont. 16R	Cont. 18R	Cont. 20R
size	6—4 x 4⅛	6—4 x 4½	6—4⅛ x 4¾
Hp. and r.p.m.	73@2400	81.5@2400	88.5@2400
Valve arrangement	overhead	overhead	overhead
No. of main bearings	7	7	7
Oiling system	pressure	pressure	pressure
Ignition, make	Delco-Remy	Delco-Remy	Delco-Remy
type	battery	battery	battery
Starter and generator	Auto-Lite	Auto-Lite	Auto-Lite
Carburetor, make	Zenith	Zenith	Zenith
Fuel feed	vacuum	vacuum	vacuum
Gasoline tank capacity	32 gal.	32 gal.	32 gal.
Radiator, make	Young	Young	Young
type	fin and tube	fin and tube	fin and tube
Clutch, make	Brown-Lipe	Brown-Lipe	Brown-Lipe
type	plate	plate	plate
Transmission, make	Brown-Lipe	Brown-Lipe	Brown-Lipe
mounted and speed	4-unit	4-unit	4-unit
Final drive	bevel	worm	worm
type	full-floating	full-floating	full-floating
Steering gear, make	Gemmer	Gemmer	Gemmer
type	worm and sector	worm and sector	worm and sector
Service brakes	four-wheel, internal Lockheed hydraulic	four-wheel, internal Lockheed hydraulic	rear expanding



Above is shown the Atterbury 4-ton Marathon Six, with the standard equipment of Budd disk wheels and dual pneumatic rear tires

Reo Announces Silent Second Speed In Transmission *of Flying Cloud*

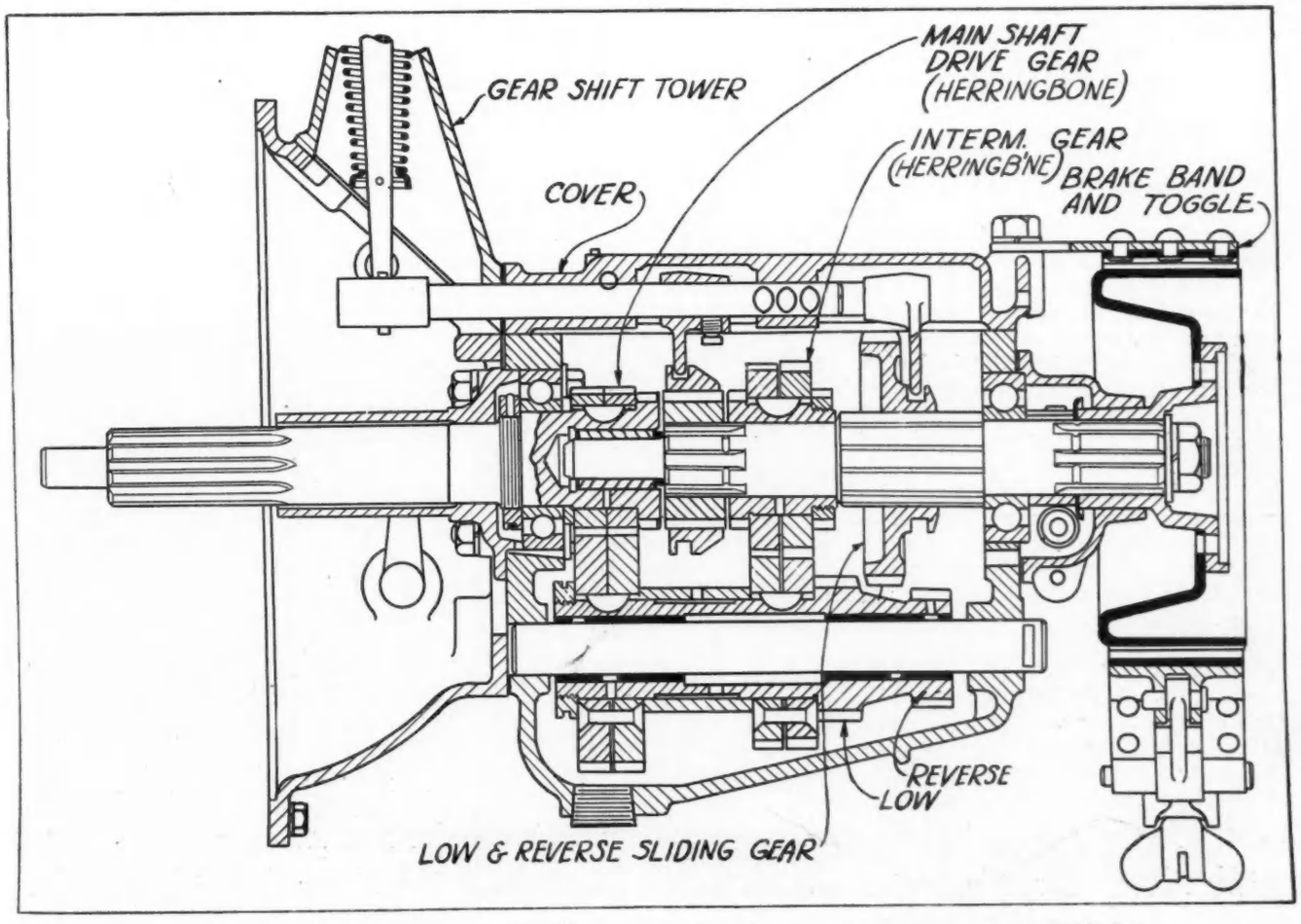
Unit has herringbone gears for constant mesh and greater tooth contact. Piston clearances in the engine are reduced to .003 in. by use of new alloy.

THE adoption of a new three-speed transmission with a silent second speed and herringbone gears for the constant mesh and second speed gear train on the Master Flying Cloud is announced by the Reo Motor Car Co. The new unit is only ¾ in. longer and only a little heavier than the former transmission with which it is interchangeable at a cost of $80.

The company claims that the new transmission is adaptable particularly to driving in heavy traffic. With a noiseless second gear, the unit permits a shift without clashing from high to second up to 40 m.p.h. and from second to high at any speed of the engine. Another important factor, the company points out, will be the safety and convenience in mountain driving, when second gear is used to save brake wear.

As the herringbone gears cannot be shifted, a dog clutch is used for engaging second gear. The dog clutch is splined to the main shaft, while the second gear on the main shaft is freely mounted. As the dog clutch is moved backward, its internal teeth mesh with the external teeth on the main shaft second gear, locking the gear to the shaft. In the forward position it engages "high" in the usual manner, the internal teeth on the dog clutch meshing with external teeth on the end of the clutch shaft. Low and reverse gears are the same as on conventional three speed transmissions.

It is claimed that in addition to greater tooth contact for a given width gear and greater quietness, the construction reduces vibration. It is interesting to note that the right and left-hand teeth on the main shaft

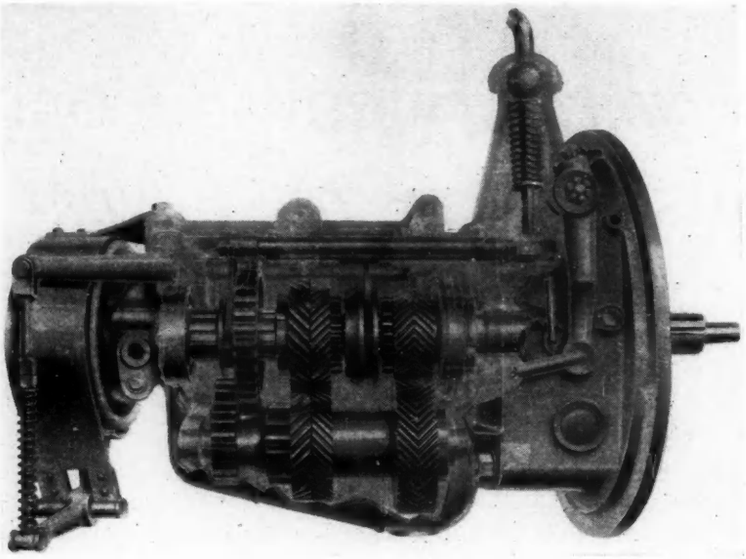


Plan drawing of the new three-speed transmission used on the Reo Master Flying Cloud

gear have different tooth pitches.

To insure quiet running, side play on the intermediate gear on the main shaft and the driven gear on the counter shaft can be adjusted by means of a screw collar. Adjustment of several thousandths of an inch is provided.

The bearings are the same size as were used in the former transmission and are therefore interchangeable. Rear axle reductions are also unchanged, remaining at 4.07 to 1 on all models except the sedan which has a 4.42 to 1 ratio. Coincidental transmission and ignition locks are retained.



Sectional photograph of the new Reo transmission, showing the herringbone gears

A new alloy, developed by the Aluminum Company of America, is being used in the pistons. The material is called "Low-Ex," and the coefficient of expansion is said to be less than that of alloys used previously, while the conductivity is from 15 per cent to 20 per cent greater. As a result the piston clearances are reduced to .003 in.

Cutting With the Oxygen Lance

PRACTICALLY everyone is familiar with oxy-acetylene cutting. The cutting blowpipe is extensively employed wherever commercial iron is used. But it is not generally realized, however, that the oxy-acetylene process can be used to cut iron and steel of almost unlimited thickness. At steel mills, breaking up salamanders and removal of furnace spills were long, expensive operations. The difficulty of scrapping heavy obsolete equipment was experienced in many industries. All of these problems are now successfully solved by the use of the oxygen lance in conjunction with the oxy-acetylene cutting blowpipe.

The accompanying illustration shows a frozen ladle of steel 8 ft. high and weighing 65 tons being cut to handling size by an oxy-acetylene lance. Its reclamation was a real problem until it was certain that it could be handled by the oxy-acetylene process.

An oxygen lance is a simple device. It consists essentially of a length of ⅛ in. or ¼ in. steel pipe connected in suitable manner to a source of oxygen. For heavy work, several cylinders of oxygen are connected together by means of a manifold. Pressure is controlled by a regulator on the manifold and a length of oxygen hose leads from the regulator to the lance.

The oxy-acetylene cutting blowpipe was used in the reclamation job pictured to start the cut at one side. The oxygen lance was then brought into play to carry the cut down to the bottom of the 8-ft. mass. Meanwhile the blowpipe was moved along the line of cut on the top surface. The lance was then raised to pick up the blowpipe cut and again carry it to the bottom. This sequence of operations was continued until the cut was completed. The two pieces thus obtained were then cut into smaller pieces of such size that they could be placed in the furnace and remelted.

Cutting 65 tons of steel with an oxygen lance

Improved Cierva Autogiro

(Continued from page 303)

vator which permits the diverted slip-stream to come in contact with the rotor (within certain limits) at any desired angle. The rate of revolution of the rotor and the lift are dependent upon the engine speed and the elevator angle.

In taking off, the plane is brought into position with the engine running, and the wheel brakes on. With the brakes remaining on, the rotor is given its initial impetus by hand, the elevator is raised and the engine speed gradually increased until the rotor is making about 120 r.p.m. At this point the brakes are released, and the rest of the take-off procedure is similar to that of an ordinary plane of comparable size, except for the sharp reduction of the unstick period, which is about half that of the conventional plane and claimed by the inventor to be as short as 75 yd.

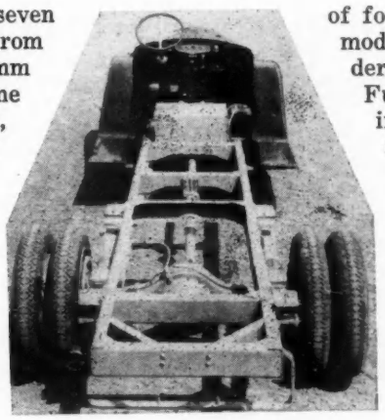
Once in the air, the Autogiro possesses a degree of stability almost unheard of. It will maintain altitude at a speed of 25 m.p.h., and at speeds below this does not show any spinning tendencies but simply enters its normal gliding angle of about 6.5 to 1. In the air, the action of the slip-stream on the rotor is accelerated by the forward motion, until the rotor reaches a maximum speed of 170 r.p.m. The cruising speed of the plane is not seriously affected. Side slip in turning is reduced to a minimum.

Gramm Offers Seven *Truck Models* With *Six-Cylinder* Engines

Prices range from $1,395 for the 1½-ton chassis upward to $6,545 for the 5-ton series. Four-speed transmission is used on all models.

A NEW line of trucks, comprising seven models and ranging in capacity from 1½ to 5 tons is offered by Gramm Motors, Inc., Lima, Ohio. The entire line is equipped with six-cylinder engines, four-speed transmissions and four-wheel brakes. Model designations and capacities are as follows: Model B-140, 1½-ton; C-160, 2; D-160, 2½; E-150, 3; EY-190, 3; GY-210, 4; and HY-236, 5.

A choice of four to five wheelbases is provided in the four lighter units of the line. Propeller shafts are single or double according to the wheelbase in the first four models and triple in the remaining single wheelbase models.



View of Gramm chassis showing frame construction

Lycoming engines are used in the first four models, the 3¼ x 4½-in. 4 SL in the 1½-ton model and 3⅞ x 5-in. TS in the remaining three, while Continentals are used in the EY, GY and HY models. Model EY is powered by an overhead valve 20-R and GY by 21-R. A 16-H Continental with valves on right side is used in the 5-ton HY model. Full pressure lubrication is employed in all models, but this pressure is extended to the wrist pins in Models B and HY. Zenith carburetors and Auto-Lite starters, generators and distributors are used throughout.

Clutches vary, a single-plate Jones clutch being used in the 1½-ton model, double-plate Jones in the next two models and Fuller multiple disks in the remaining heavier models. Transmissions are unit mounted and of four speeds throughout, the three lighter models embodying Coverts and the remainder Fullers.

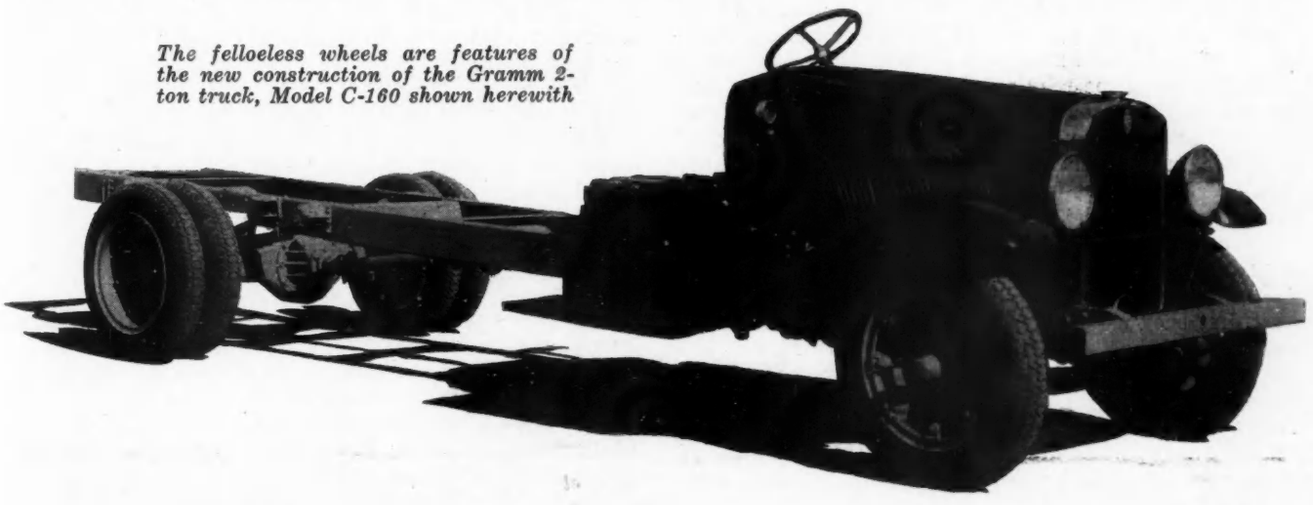
Full-floating type rear axles are standard in the line, the two lighter models incorporating Timken bevel axles and the others double-reduction Wisconsins. Springs take torque and drive in all cases. Blood Bros. metal universals and Ross cam and lever steering gears are also characteristic of all models.

Lockheed internal four-wheel brakes hydraulically operated are employed in the first three models, the remainder, with the exception of the 5-ton model, are also four-wheel brake equipped, but mechanically operated. In addition the rear brakes of Models EY and GY are energized by B-K vacuum booster brakes. The 5-ton model is equipped with four-wheel Wisconsin brakes operated by air. Hand brakes on the first three models actuate shoes externally against drums mounted on the propeller shafts, but the shoes of the remaining models, with the exception of the last, are applied internally against drums mounted on the rear axle. Tru-stop disk propeller brakes, made by American Cable Co., are used on the 5-ton model.

Pressed steel channel frames are common to the entire line, but the side rails of the three larger models are of the double drop type.

Front springs are shackled in the front and bracketed at the rear, while rear springs are bracketed in the

The felloeless wheels are features of the new construction of the Gramm 2-ton truck, Model C-160 shown herewith



Gramm Truck Specifications

Model	B-140	D-160	EY-190	HY-236
Chassis price	$1,395	$1,995	$3,535	$6,545
Capacity	1½ ton	2½ ton	3 ton	5 ton
Wheelbase, standard	140-157 in.	160-175 in.	190 in.	236 in.
Tires, front, standard	30 x 5 in.	32 x 6 in.	32 x 6 in.	36 x 8 in.
Rear, standard	30 x 5 dual	32 x 6 dual	32 x 6 dual	36 x 8 dual
Engine, make and model	Lycoming 4 SL	Lycoming TS	Continental 20 R	Continental 16 H
Lubrication, type	pressure	pressure	pressure	pressure
Carburetor, make	Zenith	Zenith	Zenith	Zenith
Starting, lighting, ignition	Auto-Lite	Auto-Lite	Auto-Lite	Auto-Lite
Radiator, make	Perfex	Perfex	Perfex	Perfex
Clutch, make	Jones	Jones	Fuller	Fuller
Type	single plate	double plate	multiple disk	multiple disk
Transmission, make	Covert A-4	Covert WAC	Fuller MGU-14	Fuller HU-16
Front axle, make	Columbia 4003	Columbia 5500	Eaton 423	Timken 1660
Rear axle, make	Timken 54000	Wisconsin 4626-L	Wisconsin 4657	Wisconsin 12517-KW
Steering gear, make	Ross	Ross	Ross	Ross
Type	cam and lever	cam and lever	cam and lever	cam and lever
Springs, front, size	40 x 2¼ in.	42 x 2¼ in.	44 x 2½ in.	44 x 3 in.
Number of leaves	8	9	12	11
Rear size	54 x 2½ in.	56 x 3 in.	60 x 3 in.	60 x 4 in.
Number of leaves	12	15	15	16
Auxiliary size	34 x 2½ in.	34 x 3 in.	44 x 3 in.	44 x 4 in.
Number of leaves	4	5	4	4
Frame, depth	6 in.	7 in.	8⅝ in.	8⅝ in.
Wheels, make	Erie	Erie	Budd	Budd
Type	cast	cast	disk	disk

front and shackled in the rear. All shackles are of the pin and bushing type. Chassis lubrication is by Alemite. Erie cast wheels are fitted to the first four models and Budd steel disks to the remainder.

Standard equipment includes oil filters, air cleaners, speedometers, shock absorbers, spare rims, front bumpers, tire carriers, etc.

Atterbury Marathon Six Trucks Have Variety of Wheelbases

(Continued from page 304)

in five and the last in seven options, the range extending from 153 to 232 in.

All are equipped with six-cylinder overhead valve type engines, developing 70, 80 and 90 hp. in the 2½, 3 and 4-ton models, respectively. Powerplant equipment includes air cleaners and oil filters. Temperature is controlled by a thermostat. Mounted in unit with the engines are plate type Brown-Lipe clutches and Brown-Lipe four-speed transmissions.

Full-floating type rear axles are standard in the line, the first model incorporating a Timken bevel, and the others Timken worms. Lockheed internal four-wheel hydraulic brakes, energized by vacuum boosters, are employed in the first two models, while the 4-ton model is equipped with the latest type of service brakes on the rear wheels, but also furnished with a vacuum booster. Hand-brake shoes of the two lighter models contact on drums attached to the rear of transmission main shaft, but they expand on a drum attached to the rear axle worm of the 4-tonner.

Budd steel disk wheels, equipped with heavy-duty pneumatic tires with dual rears, are standard on all three models and special underslung tire racks are provided for spare wheels and tires under the rear ends of the chassis. Standard equipment further includes electric head and tail lights, starter and generator, motometer and self-locking wing radiator cap, speedometer, oil gage, crown fenders, nickel-plated front bumper, etc.

Bumper Standards Changed

As a result of the lowering of car frames, the Sub-Division on Passenger Car Bumpers of the S.A.E. Standards Committee has reviewed the present specifications for bumper height and recommends a number of changes. In the past, the bumper height has been measured with the car empty except for supplies, but it is now recommended that the nominal height as specified in the standard shall be the mean between the actual height with the car empty and with the car carrying a full passenger load.

It is further recommended that the horizontal center line of the bumper face, exclusive of fittings, shall be 17 in., plus and minus ⅛ in. per in. of effective face, above the ground for front bumpers, and 17 in., plus and minus ¼ in. per in. of effective face, above ground for rear bumpers or fender guards. The point where the face of the bumper is to be measured is specified as follows: "The vertical spread of contact face of bumper assemblies is the distance between the upper and lower edges of the bumper impact bar or bars and shall be measured at the extreme outer end thereof."

Since it is considered important from the standpoint of appearance that bumpers be set at the proper angle and bumper pads are now generally machined on the spring horns, the Sub-Committee recommends the following additions to the present bumper specifications:

"The faces of the mounting pads for the front bumpers shall be perpendicular to the ground when the car is unloaded.

"The faces of the mounting pads for the rear bumper shall be perpendicular to the ground with the car fully loaded.

THE FORUM

Processes of Combustion in Cylinders Are Electrodynamic, Dempsey Says

Editor, AUTOMOTIVE INDUSTRIES:

The writer is most profoundly interested in the Indian club shaped pictures of fuel injections in Mr. Joachim's papers which recently appeared in your columns. He wonders why—

First, they all look alike, although the injection mechanism differs, the contour of the combustion chamber differs, the fuel is injected under different pressures, and the orifices are of different shapes. They are all strikingly similar, having a central dense core of uniform diameter surrounded by an envelope of less density and unequal diameter, simulating a tenpin or Indian club. Does this indicate that the development of a high-speed Diesel engine is not a problem of mechanics but a question of scientific limitations?

Second, if turbulence exists in the combustion air, why do not the pictures show some deflection of the core from a straight line?

Third, there seems to be no direct experimental evidence that turbulence actually takes place (before combustion) in the gases under pressure within the closed vessel and no known law or laws of physics that would account for its existence.

Fourth, if according to accepted thermodynamics, heat flows from high temperature to a lower temperature; and, according to Boyle's law the combustion air is pressing on all sides of the fuel stream with equal force, tending to prevent expansion of the core, does the combustion air lose heat to the core causing the fuel to expand into vapor against the pressure of the combustion air and the viscosity of the fuel; or is the expansion and vaporization of the fuel due to osmotic force or some other force inherent in the fuel that is static under some conditions and dynamic under other conditions?

The writer believes that in fact no turbulence can exist in a combustion engine cylinder after the intake valve closes, and that there is no law of physics that would justify the belief that turbulence could be made to exist by changing the contour of the piston and cylinder head. The writer holds that *heat in esse* does not exist, that it is not a separate entity like atoms and molecules, that it is not a quality or attribute of matter, but is simply the evidence and measure of electronic and protonic activity, that all the forces known to man originate when the perfect equilibrium normally existing between electrons and protons is destroyed, and ends when this equilibrium is restored.

All the processes of combustion taking place within the cylinders of combustion engines are electrodynamic processes and not thermodynamic. Thermodynamics is the old testament of physics; electrodynamics is its new testament.

The Indian club shape of all of the photographs of fuel injections is believed to be due to the fact that they all represent the resultant of three different and differently directed forces. viz.:

1. The force of the fuel pump directed in a straight line and operating according to the inverse square law, i.e., gradually diminishing as the fuel pierces the compressed air.

2. The force of the kinetic energy of the combustion air, acting according to Boyle's law and exerting equal pressure in all directions tending to maintain the cylindrical shape of the fuel.

3. The *repulsive* force of the negatively charged electrons and positively charged protons of the fuel, which at distances comparable to 10^{-8} c.m., changes *from attraction to repulsion* and increases as the distance diminishes, not according to the inverse square law but to the law of a higher power; hence the first law would tend to thrust the fuel forward, the second law would tend by constant pressure to maintain a uniform cylindrical diameter of the fuel stream, and the third law would tend to increase the diameter; and the resultant of these three forces plus time would produce pictures of the contour shown. This is the new law of electrodynamics suggested by Sir J. J. Thomson,* author of the electron theory, when he said:

"I shall assume that the law of force between a positive charge and an electron is expressed by the equation

$$F = \frac{Ee}{r^2}\left(1 - \frac{c}{r}\right)$$

where F is the attraction between the charges E; e, the positive and negative charges on the core and electrons, respectively; r, the distance between them, and c is a constant varying from one kind of atom to another, it is the distance at which the force changes from attraction to repulsion and is of the order of 10^{-8} c.m."

W. L. DEMPSEY,
St. Louis, Mo.

* "The Electron in Chemistry" by Sir J. J. Thomson, published by the Franklin Institute, Philadelphia, Pa.—p. 4.

NEW DEVELOPMENTS—Automotive

Societe Genevoise Jig Borers

THE R. Y. Ferner Co., Washington, D. C., is offering new models of its jig boring machines Nos. 4 and 5, which are made by the Societe Genevoise d'Instruments de Physique, of Geneva, Switzerland.

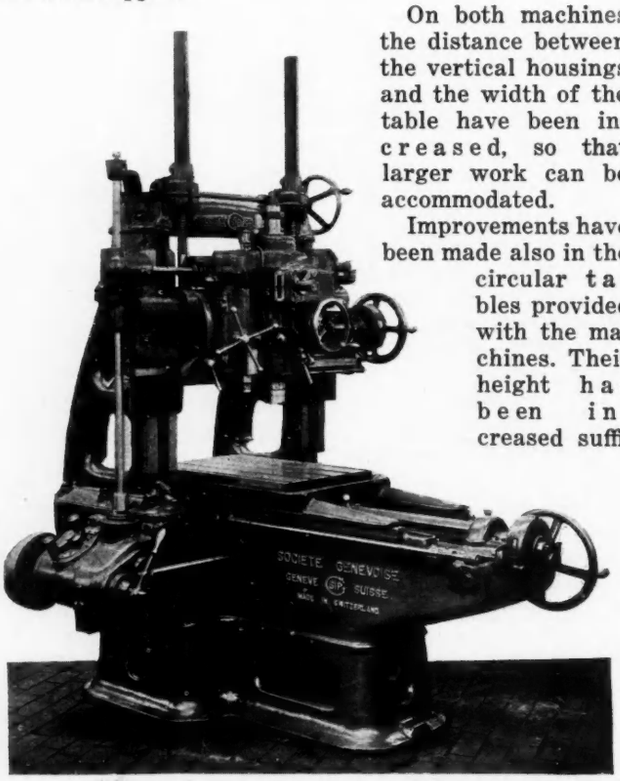
Numerous improvements have been embodied in the new models. The diameter of the quill in the main boring head has been increased to make possible the use of a No. 4 (instead of a No. 3) Morse taper in the main spindle of the No. 5 machine, and of the No. 2 taper in the No. 4 machine. Some time ago the feed of the spindle was increased to 7 in. on the No. 5 machine, and this same feed is now provided also on the No. 4. An oil pump for the lubrication of the main spindle, with sight-drip feed controlled by a needle valve, as well as a sight-feed oiler on the high-speed spindle, has been added to both machines.

The high-speed spindle has been increased in size to permit of the use of a No. 1 Morse taper, avoiding the necessity of using collets for straight-shanked tools. The drilling and boring capacity of the high-speed spindle is therefore increased.

With the elimination of the use of collets in the high-speed spindle, a new form of holder for the guide bushings, used to keep the ends of the drills from vibrating, has been adopted, which facilitates insertion of the guide bushing and of the tool. Guide bushings are supplied for use with up to 5/16 in. diam., and a Jacobs chuck of 0 to ¼ in. capacity is provided for holding small straight-shanked tools. Several additional accessories are now supplied.

On both machines the distance between the vertical housings and the width of the table have been increased, so that larger work can be accommodated.

Improvements have been made also in the circular tables provided with the machines. Their height has been increased sufficiently to permit sliding the circular table to any point on the rectangular table or on a work bench without interference from the handle of the worm screw. The shaft of the worm screw has been designed to permit the quick attachment of any of a set of three indexing disks, which make it possible to lay out in a circle any number of holes from 2 to 100 without calculation.



Improved Societe Genevoise jig borer No. 4

A releasing clutch on the hand wheel for moving the table has been added, which avoids accidental movement after the setting has been made. On No. 5 machine, a hand wheel with connection by shaft and gears to the horizontal shaft rotates the nuts on the vertical raising screws. Protecting covers for the projecting vertical screws are now a regular feature. This also applies to the prismatic microscope furnished with the machine, consisting of a 45 deg. prism for reflection of illumination from a light source to the work.

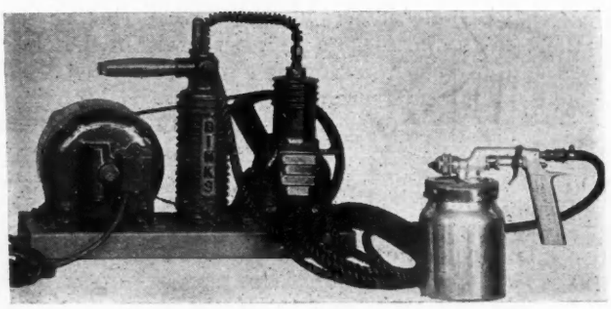
The pump and piping for the cooling system are now extra equipment, and a belt tightener is also supplied as an extra. Another new accessory is a vertical indicator device for checking the parallelism of a work piece with the table, etc.

A micrometer drum on the shaft of the hand feed of both spindles is provided for measurement of the exact depth of blind holes or of counterboring.

Binks Spray Painting Unit

THE Binks Manufacturing Co., 3114 Carroll Ave., Chicago, announces the completion of an all-purpose utility spray painting and finishing outfit, known as the Binks New Hurley Unit.

This outfit is being manufactured for general utility work such as touching up, refinishing, repainting and lacquering practically any product within an organization. It is also adapted for the spraying of insecticides and disinfectants.



Binks spray painting unit

It is a complete unit equipped with a full-size quart all-metal container and a new Binks pressure cup spray gun supplying an atomized flat spray 4 in. in width. The air compressor unit is belt-driven and connected to a ¼-hp. General Electric motor. This unit has a capacity of 2.16 cu. ft. of air per min.

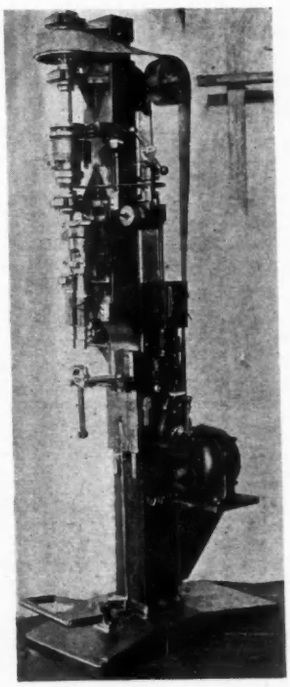
A rib cast-iron air container is mounted between the motor and the compressor on a pressed metal base, all of which is mounted on rubber feet. The cylinder and base are cast in block of seasoned gray iron and accurately machined.

Parts, Accessories and Production Tools

Ten feet of rubber-covered electric cord, attachment plug, and 10 feet of durable braided rubber air hose are attached to the outfit.

Baush Assembly Machine

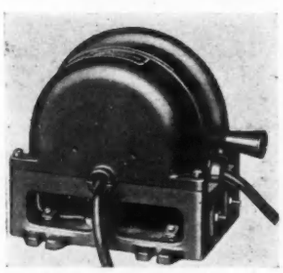
ABOUT two years ago we illustrated in these columns a two-spindle assembling machine for driving nuts, caps screws, and the like, which had been developed by the Metalwood Manufacturing Co. of Detroit. This machine has now been taken over and placed in production by the Baush Machine Tool Co. of Springfield, Mass., and a number of improvements have been made in its design. A centrifugal mechanism is now used for making and breaking the circuit of the magnetic clutch through a mercury switch, in place of the somewhat cumbersome epicyclic mechanism previously used, and which was located on the opposite side of the machine. The electric circuit has been simplified, and a more substantial switch provided. If no direct current is available in the shop, the machine may be provided with a small direct current generator, as shown in the accompanying illustration.



Baush two-spindle assembling machine

Taft-Peirce Magnetic Chuck

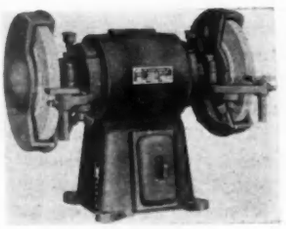
THE Taft-Peirce Mfg. Co., Woonsocket, R. I., has developed a Super-Power magnetic chuck, in which, it is claimed, many important improvements have been made. The chuck is entirely waterproof and is equipped with a demagnetizing switch of the field discharge type to control the voltage throughout the operation range of the chuck. The new switch absorbs and dissipates excessive voltage surge at the moment of discharge, without permitting it to pass through the coils of the chuck and without any change in the methods to which machine operators have become accustomed. No additional relays or moving parts are required, and all parts of the switch are of the same rugged, durable construction which characterizes Taft-Peirce products.



Taft-Peirce chuck

Schauer Ideal Grinder

THE Schauer Machine Co., Cincinnati, Ohio, manufacturers of "Ideal" portable electric tools, have brought out an improved 1-hp. bench grinder for use with either alternating or direct current, which is especially efficient for general shop use.



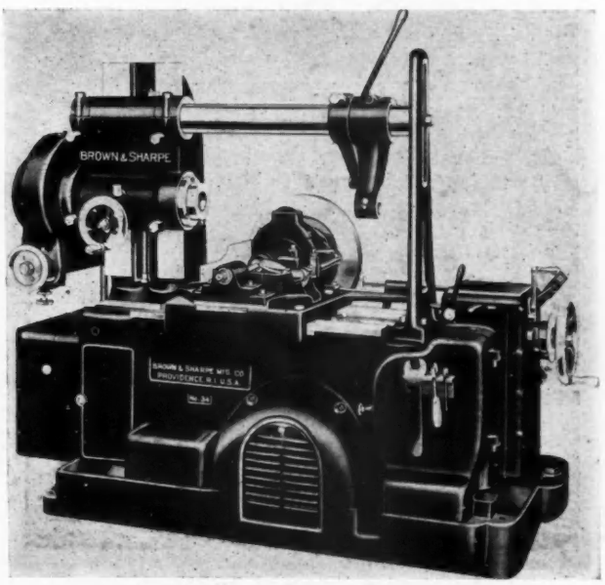
Improved Ideal grinder

It is mounted on an improved base which contains the safety type toggle switch for quick make or break of contact. The motor is constructed of highest grade materials, and especially designed to give maximum service under all conditions. It is totally enclosed for use in either wet or dry grinding. Wheels are enclosed by newly designed end guards. The tool rests are so mounted on the wheel guard as to be readily adjustable for any grinding position. End bells are designed to give maximum working space between motor housing and wheel. The latest type solid race double row ball bearings are used, one at each end of the shaft. They operate in grease and are dustproof.

Height from base of grinder to center of wheel is 11 in. Ten in. by 1 in. wheels are used, running at 2000 r.p.m. for direct current and 1750 r.p.m. for alternating current. The weight is 162 lb.

Gear Hobbing Machine

THE Brown & Sharpe Mfg. Co. of Providence, R. I., has announced the redesign of the No. 34 Gear Hobbing Machine and the incorporation of several new



Brown & Sharpe gear hobbing machine

features. The machine is now of the motor-in-base type and is equipped with an oil filter. The oiling arrangement has been simplified and the cutter coolant pump has been relocated. Anti-friction bearings are used at important points throughout the machine.

The motor-in-base arrangement provides an economy of floor space, the motor being completely enclosed in a compartment in the base, yet readily accessible for oiling and adjustment. The machine can also be driven from the overhead works, and when so driven, a 4-in. belt, running at a constant speed of 500 r.p.m., is used.

The oil filter is located at the rear of the machine, where it can be easily cleaned. Oil is pumped from the feed case through the filter and to the indexing mechanism and the feed case bearings, from where the overflow is drained back to the feed case supply. The hob slide is oiled from one station for both the feed screw and the ways.

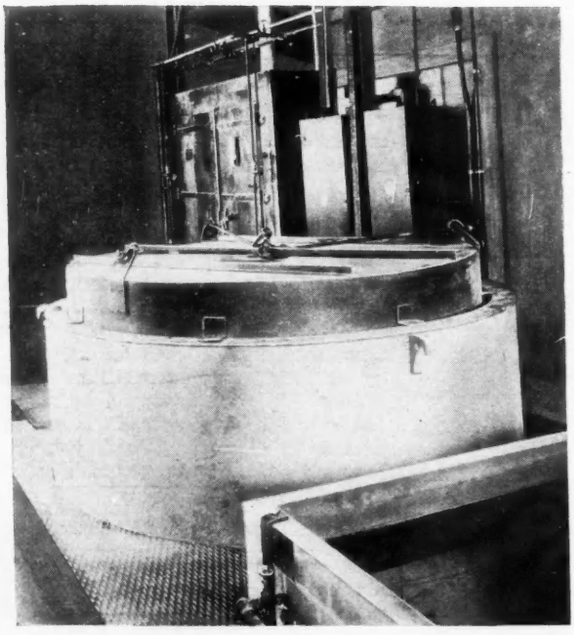
The cutter coolant pump, located at the rear of the feed case, is readily accessible. It is driven by a chain from the driving pulley shaft and can be easily disconnected when cutting cast iron. The indexing mechanism, the driving pulley shaft and the hob driving shaft are carried on anti-friction bearings, assuring economy of power transfer.

Furnace for Heat Treating

THE General Electric Co. announces a new electric furnace especially designed to heat treat aluminum alloys. The new furnace is a pit type cylindrical unit having two circuits: one, rated 220 volts, three-phase with a Y-series connection, is in the top; the other, in the lower side walls and bottom, is rated 220 volts, three-phase with a Y-delta connection. At high heat the power consumption is 84 kw. and at low heat 28 kw.

In a typical application of this furnace a run of castings weighing approximately 500 lb. plus a basket weight of 700 lb., both at room temperature was placed in the furnace at a temperature of 960 deg. Fahr. In 1½ hr. the center of the charge was at the heat-treating temperature, although for a third of this time the furnace was operating on low heat. A check showed that the outside of the charge next to the heating units was no higher than 960 deg. Fahr.

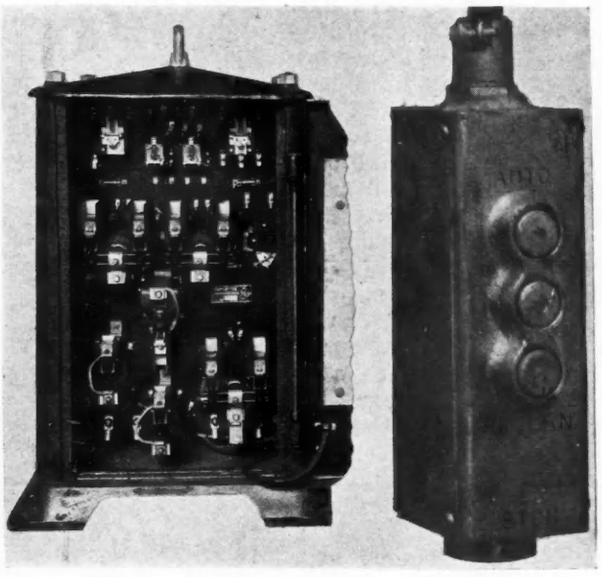
In this typical furnace the working space had a diameter of 4 ft. and depth of 6 ft. It was designed to heat a charge weighing 1500 lb. plus a basket weight of 500 lb., from 600 to 950 deg. Fahr. in 1 hr., and to hold the charge at the latter temperature for 12 hrs. The estimated rate of radiation at the holding temperature is 17 kw.



Pit type electric furnace for heat treating aluminum alloy castings

G. E. Planer Controller

TO meet the demand for control equipment which will allow all automatic operations of a planer to be governed from a pendant push-button station, the General Electric Co. announces a new magnetic controller and push-button station designated CR-4602-L-5 and CR-2940-BS-14-CR respectively.



General Electric planer panel (left) and pendant master switch

The panel is of standard design, with an added section on which are mounted the relaying contactors governed by the push-button station. This extra section may be added to standard pedestal type magnetic controllers now in service

The pendant push-button station has four buttons: "Automatic," "Out," "Return" and "Stop." The "Start" button is located at the controller itself, but, after pressing the "Stop" button at the pendant station, operation may be resumed by pressing the "Automatic" button. The "Stop" button is at the bottom of the station, readily accessible from all angles. The push-button station is very light, is approximately 2 in. wide, 6 in. high and 2¼ in. deep.

If the wrong button is pressed for the position of the planer at that time, nothing will happen.

The outstanding advantage of the new control is that, when machining large castings, it is not necessary for the operator to climb out of the casting every time it is desired to operate. He has full control from the pendant push-button station.

Weiss Universal Joint

THE Weiss Engineering Corp. of New York now has available an improved Weiss Universal Joint of constant velocity for 40 deg. of angular velocity suitable for front-wheel-drive automobiles. The improved and unique design results in exceptionally high torque capacity in addition to the known characteristics of easy steering and smooth operation of front-drive mechanism, according to Carl W. Weiss, vice-president and chief engineer of the corporation.

Shock Absorbing Cylinder Head

A NEW design for the cylinder head of a side valve engine has been developed by H. R. Ricardo and has been termed a "shock absorber" head, to express its smooth-running qualities.

The original Ricardo head, beneficial in permitting higher compressions to be used without increase in tendency toward detonation, has given rise to dissatisfaction in some cases, viz., where the engine as a whole or in some details has not been sufficiently rigid. For example, if there has been insufficient resistance to torsion in the crankshaft or whip of the connecting rods, the extremely rapid rise of pressure in the combustion chamber gave rise to a vibration of high frequency and "roughness" in running.

The new head eliminates that possibility by what is termed a two-phase combustion process. The design may not be illustrated at the moment, but it may be stated that a small proportion of the charge is isolated in a shallow pocket and fired first, burning relatively slowly and producing a gradual rise in and application of pressure. The second phase commences when the flame reaches the mouth of the pocket and consists of a rapid spread of combustion through the main turbulent charge. The initial pressure rise takes up any "spring" that may occur in the working parts.

As will be realized from the foregoing, the new design is reminiscent of the antechamber type of Diesel cylinder head.

The new head is said to give almost as high a power output and efficiency as the original design, but with obviously smoother running, though the difference is more evident with some engines than with others. It will be made available first, in England, for fitting to existing Austin Sevens by a London firm that will manufacture under license from Ricardo & Co., Ltd.

Peerless Blue-Printing Machine

INCREASED speed of production is the chief feature of the new Peerless Model 30 blue-printing machine recently brought out by the C. F. Pease Co., 835 N. Franklin St., Chicago, Ill. Following the usual practice, the tracings are laid face up on a continuous roll of paper, feeding at the front of the machine, and are carried upward around a semi-circular uniformly curved segment of French plate glass, past a bank of arc lamps.

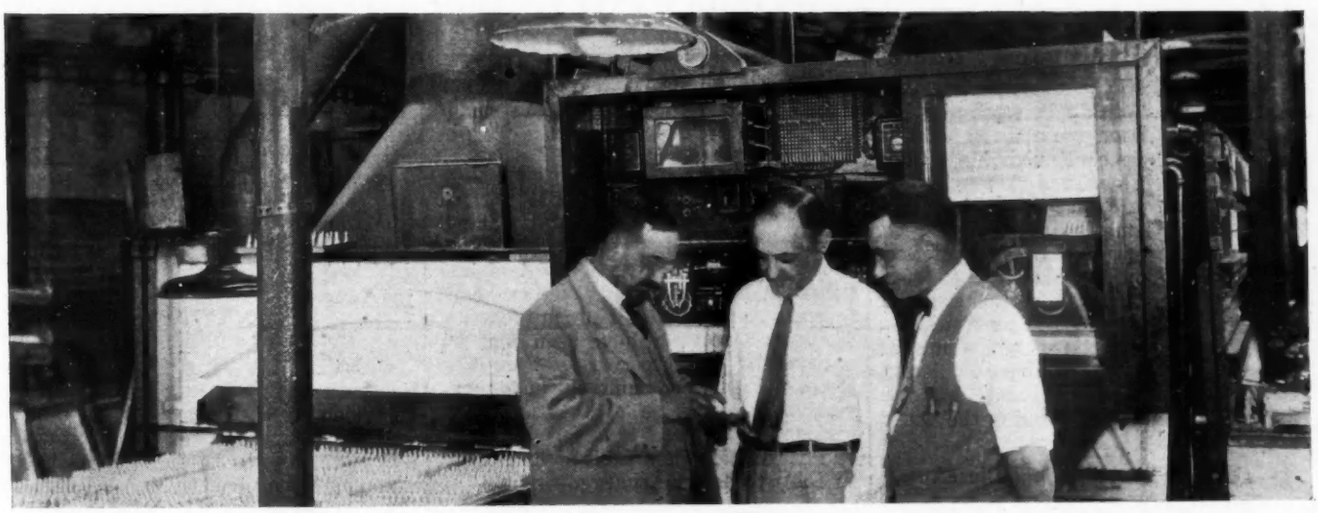
After the exposure has been made, the tracings are automatically returned to the tray at the front, while the prints on the continuous roll of paper are carried through the machine, and the subsequent operations of washing, potashing and drying take place in succession. The paper is then automatically rolled up in loose cylinder form at the rear of the machine for cutting and trimming. The roll of paper is gear-driven.

Model 30 is equipped with a ¼ hp. variable speed motor direct connected to a reducing gear running in oil. The machine is gear-driven throughout and has a speed range of from 4 in. to 12 ft. per min. At the left side of the machine and mounted in the feed table is a four-point "auto-type" gearshift, which has two forward and one reverse motion positions, as well as a neutral position.

The provision of a reversing gear is said to be something entirely new in blue-printing machines; it enables the operator to withdraw tracings or run back the leader roll, whenever desired, without inconvenience.

There is another speed control, in the form of a hand-operated dial, at the right of the machine, by means of which the printing speed can be quickly changed to conform to the character of the tracings from which prints are being made.

New Type of Tunnel Kiln



Above is pictured spark plugs entering a new type tunnel kiln at the AC Spark Plug Co. plant, Flint, Mich. In the photograph are, left to right: D. H. Corbin, works manager of the AC plant in Birmingham, England; Taine G. McDougal, vice-president of AC in charge of ceramics and foreign plants, and Curtis Ortman, plant superintendent. The kiln employs the surface combustion principle in firing insulators at 2400 deg. Fahr.

First with the News

Reliable, Accurate

News of the Industry

PAGE 314 VOLUME 61 *Philadelphia, Saturday, August 31, 1929* NUMBER 9

End of August Shows Gain In Automotive Production

PHILADELPHIA, Aug. 29—During the final week of August automobile factories, taken as a whole, have shown a higher level of activity than during the first half of the month, while the general demand in the field continues favorable and prospects for an active fall business already are in evidence. Sales executives look upon the improved farm prices as an important factor in the outlook for good sales during the autumn months.

Commitments to parts makers indicate no drastic curtailment such as would be necessary to bring the total production for the year to below 5,500,000 vehicles for the United States and Canada.

According to all present indications, it would appear not improbable that the 5,000,000 figure will be reached by the end of October. Actual production for the first seven months in the United States and Canada has been fixed by the Department of Commerce as 3,929,545 vehicles.

Adding 500,000 units to this it would appear that the production of 570,455 units for the two months of September and October would bring the total for the industry as a whole to 5,000,000 by the close of the first ten months.

In view of all present indications this would seem not only possible but almost an assured fact.

Maj. Young Will Continue Aero Industry Policies

WASHINGTON, Aug. 29—The constructive relationship between the Department of Commerce and the aviation industry will be continued, Maj. Clarence M. Young declared this week following his appointment as Assistant Secretary of Commerce for Aeronautics. Colonel Young succeeds Assistant Secretary William P. MacCracken, Jr., whose resignation from government service was announced some time ago. Maj. Young served for two years as director of aeronautics under Assistant Secretary MacCracken and was an officer in the air corps during the world war.

United-Sikorsky Deal Closed

NEW YORK, Aug. 28—Final acquisition of the Sikorsky Aviation Corp. by the United Aircraft & Transport Corp. has become effective according to announcement issued yesterday by the latter company. Sufficient Sikorsky stock has been deposited to assure the exchange under the plan of the agreement.

Civilian Airplanes Exceed Cars of 1900

WASHINGTON, Aug. 29 — More airplanes are in civilian operation in the United States today than there were automobiles in use in 1900, and the number of planes, aside from those in military operations, has increased about 200 per cent since early in 1926, according to the air travel division of the American Automobile Association.

The division reported that there were 8000 automobiles in use in 1900, and all of these were passenger cars, while available figures showed that 8064 civilian planes were now in operation. These are used for passenger-carrying, transporting the mails and freight, forestry patrol duty and also for private service.

Fleetwood Opens New Plant

DETROIT, Aug. 28 — Establishment of an additional manufacturing unit by the Fleetwood Body Corp. was announced by Fleetwood officials here today. The company's manufacturing facilities heretofore have been confined exclusively to Fleetwood, Pa. The Detroit Fleetwood unit is under the personal supervision of O. L. Currier, resident manager. Mr. Currier, staff and production men arrived in Detroit recently to assume charge.

Produce Gasoline-Electric Car

CHICOPEE FALLS, MASS., Aug 28—Rauch & Lang, Inc., is producing a new gasoline-electric car.

New Aero Engines Shown in Cleveland

Several Airplanes Indicate Newest Trends in Designing

CLEVELAND, Aug. 29—Two engines and several airplanes, not previously exhibited, were shown at the Cleveland Aeronautical Exposition, held in connection with the National Air Races, Aug. 24 to 31. The number of products shown did not set any new mark, and in many cases they were exhibited by distributors instead of the manufacturing companies.

The General Airmotors Co., Inc., Scranton, Pa., exhibited a 5-cyl., 144 hp. radial type engine. The engine is undergoing Department of Commerce approved type tests. The engine features a compression control mechanism, which, through a spiral keyway in the altitude adjustment driving gear reduces the cylinder compression. A rotary induction system is provided, with single outlets for each cylinder, the manifolding itself splitting half way to the valves, with the pushrods passing up between the two halves.

A second new engine was shown by the Dayton Airplane Engine Co. It was a horizontal opposed 8-cyl. air-cooled type with its cylinder assemblies interchangeable with other types of Dayton engines.

The General Airplanes Corp., Buffalo, exhibited a new mail plane powered with a single Pratt & Whitney "Hornet." In addition the company exhibited a new parasol type monoplane powered with a Warner engine and designed for training use.

The R. D. Bone Co., Los Angeles, exhibited its Golden Eagle parasol tandem cockpit monoplane, designed for a 100-hp. engine.

Public Accepting Airplanes

CLEVELAND, Aug. 28—"During the next two or three years I expect to see a sudden psychological change on the part of the American public toward flying, and it will be accepted as is the automobile and the radio," William B. Stout said at the dinner meeting of the Society of Automotive Engineers. "Our job is not so much to get the public to fly in what we now have, as to be ready with equipment when the public decides

it wants something else," he continued.

Edward P. Warner, president of the society, discussed in dollars and cents the cost for every hour saved over a given route by the airplane. His paper pointed out that, to obtain maximum economy consistent with maximum time saving, it will be necessary in the future to increase landing speeds considerably for commercial airplanes. This means even larger airports, he pointed out. He predicted, however, lower landing speeds for planes designed for private operation.

Backer Found to Sponsor Schneider Racer for 1931

ANNAPOLIS, MD., Aug. 27 — A wealthy private backer, impressed with the attempts made to perfect the Mercury racer for entry in the Schneider Cup race, has offered to finance the construction of three racing seaplanes to represent the United States in the 1931 Schneider race, Lieutenant Alford J. Williams, naval aviator, revealed here today.

The name of the private backer was not disclosed, but Lieutenant Williams said the offer would be accepted and preparations begun soon for the design and construction of the planes, in the event the government adheres to its policy of non-participation. The Mercury plane, which failed to meet performance tests during the last three weeks so as to qualify for entrance in the race, also was privately financed.

If the offer is accepted, Lieutenant Williams said that the plane design would probably not differ materially from that of the Mercury racer, but new engines will be developed of sufficient power to assure the racers a chance of competing upon equal terms with racing planes developed by the foreign governments expected to compete in the 1931 race.

Auburn Announces Cord Prices

AUBURN, IND., Aug. 27 — New prices on Cord front-drive automobiles, announced by the Auburn Automobile Co., are $3,095 for sedans and broughams, and $3,295 for the phaeton sedan and cabriolet, f.o.b. Auburn.

Franklin Makes Record Shipments

SYRACUSE, N. Y., Aug. 28—The H. H. Franklin Mfg. Co., in seven and one-half months ended Aug. 16, shipped 10,591 Franklin cars, exceeding the previous record full year shipments of 10,566 cars.

Toledo Employment Is Down

TOLEDO, Aug. 27—Employment in Toledo automotive plants is thought now to be at lowest point for the year, 51 plants reported more than 30,000 workers which is about 2000 less than a year ago.

Budd Receives $10,000,000 Order

PHILADELPHIA, Aug. 28—The Edward G. Budd Mfg. Co. has received an order for all-steel automobile bodies amounting to $10,000,000. Shipments on this order will start early in January.

New Rule Will Block Incompetent Pilots

WASHINGTON, Aug. 28 — New regulations to protect the flying public against incompetent aviators will be put into effect Sept. 1 by the Department of Commerce.

Maj. Clarence M. Young, Assistant Secretary for Aeronautics, announced that the new regulations will permit a transport pilot to carry passengers only in the type of plane in which he has passed an examination.

Sales of Passenger Cars Total 3,220,000 in 1928

WASHINGTON, Aug. 24—New passenger car sales in the United States in 1928 totaled 3,220,000, according to revised figures made public today by the American Motorists' Association. The figures show that during the year 1,007,000 more cars were bought than were junked, the total number junked aggregating 2,213,000 cars.

Total passenger car registration as of Jan. 1, 1929, was 21,379,125, thus putting the percentage of new cars purchased at 15.06 per cent.

Figured on a basis of the total number of new automobiles purchased during the year, New York, purchasing 304,800 new passenger cars, topped the list, and Pennsylvania was second with 222,600.

Computed on a percentage basis, Michigan and Connecticut motorists purchased the highest number of new passenger cars. Registration of passenger cars as of Jan. 1, 1929, totaled 1,084,615 in Michigan and 261,091 in Connecticut, of which 203,600 and 48,300, respectively, or 19 per cent in each state, were purchased in 1928.

On the same basis, New Jersey, Massachusetts and Montana ranked second with 18 per cent each; New York, South Dakota, District of Columbia, Rhode Island and Delaware ranked third with 17 per cent each, and Pennsylvania, Oklahoma, Nebraska, Kentucky, Tennessee, Mississippi, Utah and Wyoming tying for fourth place with a 16 percentage of new cars purchased during the year.

Warren Packard

DETROIT, Aug. 26—Warren Packard, son of W. D. Packard, of Warren, Ohio, one of the founders of the Packard Motor Car Co., was killed, and Talbott Barnhard, his companion, seriously injured here late today when their small seaplane fell in an inlet of the Detroit River. Mr. Packard had been managing his father's estate since the death of the latter about three years ago, as well as the estate of his uncle, the late J. D. Packard, another of the founders of the Packard company. He was an ensign in the United States Navy during the war.

Neal Adair Leaves M.E.A. Staff Post

Former Editor of Motor World Joins "Motor," Ruark Takes up Work

NEW YORK, Aug. 28—Neal G. Adair, sales development manager of the Motor and Equipment Association since 1924, has resigned his post to join the editorial staff of "*Motor.*" B. W. Ruark, assistant managing director of the association, has been appointed to succeed Mr. Adair as sales development manager and will also have charge of the activities of Divisions B and C of the association.

Mr. Adair was formerly editor of *Motor World,* being associated with the editorial department of the Class Journal Co. from 1919 to 1924. He joined the former Motor & Accessory Manufacturers Association in 1924 to take charge of their sales development work. He was largely responsible for the development of the association's show activities and organized and developed the sales development department. Mr. Adair has also been responsible for the development of the statistical and publication work carried on by the association and has broadened these activities in the new M.E.A.

Mr. Ruark, who succeeds Mr. Adair as sales development manager, was for several years assistant to Commissioner Webster of the former Automotive Equipment Association and served as acting commissioner of that organization for the period just previous to the formation of the M.E.A.

Soucek Develops Oxygen Device for High Flying

WASHINGTON, Aug. 27—An improved oxygen breathing device, which is expected to permit aviators to rise to altitudes as high as 50,000 ft. without danger of death due to lack of oxygen and the low pressure of the rarefield atmosphere, has been developed by Lieutenant Apollo Soucek, naval aviator, in preparation for renewed attempts to break the world airplane altitude record.

With the new device in his Wright Apache plane powered with its rebuilt Wasp motor, Lieutenant Soucek said today he was confident he would have an equal chance of breaking the record of 41,760 ft. now held by Willi Neunhofen, the German flier. Neunhofen's record was made May 26, eighteen days after Lieutenant Soucek had set the mark at 39,140 ft. Soucek still holds the record for seaplaners with a mark of 38,560 ft. made on June 4.

The new breathing device, perfected with the aid of scientists of the Bureau of Standards and medical officers of the Naval Bureau of Aeronautics, utilizes the pressure of the oxygen in the cartridges in which it is compressed to compensate for the lack of air pressure.

G.M. Holdings Gain, Says Sloan's Report

$50,000,000 in Investments Added; Real Estate Value Increases

NEW YORK, Aug. 29—Consolidated balance sheet of General Motors Corp. as of June 30, 1929, mailed to stockholders last week, shows, in addition to earnings and sales figures previously published, an increase in investments in affiliated and miscellaneous companies of more than $50,000,000.

This, according to a letter from Alfred P. Sloan, Jr., which accompanies the statement, includes the purchase for cash of a substantial interest in Adam Opel A.G. of Russelsheim, Germany; the purchase of a 25 per cent interest in Bendix Aviation Corp., and a 40 per cent interest in Fokker Aircraft Corp., together with certain other miscellaneous items. The real estate, plant and equipment account also shows an increase of $34,504,514.

"In this connection," Mr. Sloan continues, "it might be stated that it is the policy of General Motors to avail itself of opportunities that may develop from time to time not only to broaden its present manufacturing operations at home and abroad, but to add to its general activities in lines with which its organization is more or less familiar, or can constructively deal in the interest of the stockholders. This should logically result in diversifying the corporation's investments and adding to its profit account."

In commenting on the apparent increase in dealers' stocks of cars during the six months ended June 30, Mr. Sloan points out that present stocks represent approximately one month's current retail sales. The apparent increase is due to unusual model changes at the beginning of the year in the more important car lines, prior to which stocks were depleted to the extent that retail sales were limited during the first quarter. The addition of two new lines of cars and the necessary stocking of dealers in these two lines has also contributed to the apparent increase in dealers' stocks.

The consolidated balance sheet of General Motors Corp. as of June 30, 1929, compares as follows:

Assets

	1929	1928
R. E. plt & eqpt.	$577,491,669	$503,210,572
Gdwl, pats, etc...	44,803,661	43,714,555
Cash	110,883,777	131,467,323
Govt secur.	45,642,749	122,688,807
Mark sec., etc. ..	497,965	10,227,538
Sight drafts	24,235,945	25,334,365
Notes rec.	2,022,939	1,582,882
Accts & accpt rec.	53,625,615	46,210,644
Inventories	217,478,388	157,778,443
Prepd exp.	2,639,145	2,352,863
Invst oth. cos. ..	172,794,828	109,607,896
G. M. stk in treas.	39,777,446	38,115,887
Def. exp.	18,023,364	13,456,295
Total	$1,309,917,491	$1,205,747,979

Liabilities

7% pfd stock....	$131,364,000	$130,959,600
6% pfd stock....	1,464,000	1,630,000
6% deb. stock...	2,088,000	2,326,400
Common stock ..	*435,000,000	435,000,000
Accounts payable	59,626,421	56,045,173
Tax, payrolls, etc., accrued	44,639,947	46,767,638
Federal taxes ...	35,170,906	38,115,976
Emp. sav. fd. (curr.)	8,520,131	.....
Accrued dividends	1,568,099	1,567,425
Ext. com. divs...	13,050,000	34,800,000
Depreciation res.	177,859,100	153,300,509
Other reserve ...	46,582,719	39,712,628
Minority int in subs	3,929,095	3,201,914
Surplus	349,055,073	262,320,716
Total	$1,309,917,491	$1,205,747,979

*Represented by 43,500,000 shares, par $10.

Coach Lines Increasing in Popularity in England

WASHINGTON, Aug. 29—Great Britain has gone motor-coach wise. While the increase in private vehicles has increased but 10 per cent in the last five years in Great Britain, according to official figures, the commercial percentage has been quadrupled.

Today there are 3312 regular motor-coach services operating in England and Wales, according to an announcement this week by the Department of Commerce. These services link up more than 18,000 towns, villages and hamlets. In addition to this there are 296 regular express motor-coach services between distant points and a large number of seasonal services. It is estimated that there are more than 6000 motor-coach companies operating in England and Wales.

Correction

In the article "Earnings Fail to Match Production in First Six Months of 1929," which appeared on page 253 of *Automotive Industries* last week, the Jordan Motor Car Co. was erroneously reported to have earned $473,372 during the first six months of 1928. This figure should have appeared as a deficit, and the net change of —68 per cent omitted. Subtraction of the Jordan earnings from the total figures for the 10 companies considered, would make a difference of less than one-half of 1 per cent in the earnings increase ratio. The Jordan earnings figure quoted for the first six months of 1929 was correct.

Jaeger Watch Moves Offices

DETROIT, Aug. 29—E. L. Vail, vice-president of the Jaeger Watch Co., has announced the removal of the company's offices to 304 East Forty-fifth Street, New York City.

Young Radiator Co. is Busy

RACINE, WIS., Aug. 28—The Young Radiator Co. reports operations during the last two months on a high basis, with plant operation in most departments working 12 hours per day, tool shop day and night, and with the highest number of employees on the payroll at any time in the company's history.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for AUTOMOTIVE INDUSTRIES.

NEW YORK, Aug. 29—Seasonal influences continue to be reflected in moderate trade curtailment. This trend is especially noticeable in retail business. Wholesale trade is well maintained, and, as has been true for some time past, the leading industries are operating considerably more actively than most lines of distribution.

FREIGHT CAR LOADING

Loading of revenue freight on American railroads for the week ended on Aug. 10 totaled 1,090,616 cars, which marks a reduction of 13,577 cars from the total for the preceding week but an increase of 46,348 cars above that for the corresponding period last year. Loadings for the year to date number 31,944,967 cars, as against 30,498,903 a year ago and 31,508,478 two years ago.

LUMBER

Although orders and shipments for both hardwood and softwood lumber continued to trail production during the week ended Aug. 17, there was indication of a slight improvement in the call for and shipment of softwood, according to reports from 768 hardwood and softwood mills to the National Lumber Manufacturers Association.

BRADSTREET'S REPORT

Business failures reported to Bradstreet's for the week ended Aug. 22 numbered 338, as against 289 in the preceding week and 350 in the corresponding period a year ago.

FISHER'S INDEX

Professor Fisher's weekly index of wholesale commodity prices declined last week for the fourth consecutive time. It now stands at 97.0 per cent of the 1926 average, as compared with 97.3 a week before and 97.6 two weeks before.

FEDERAL RESERVE

Bills and securities held by the Federal Reserve banks declined $27,754,000 during the week ended Aug. 21, as a result of decreases in discounts and government securities, only partly offset by an increase in bills bought in the open market. Note circulation increased $7,475,000 and reserves $13,996,000, while deposits declined $38,939,000. The reserve ratio rose from 74.6 to 75.5 per cent.

During the same period, loans of reporting member banks declined $4,000,000, a decrease of $62,000,000 in security loans being nearly offset by an increase in "all other" loans. Investments declined $23,000,000 and net demand deposits $126,000,000. Brokers' loans in New York City increased $133,000,000 to a new high record at $6,085,000,000.

July Automotive Supplies Show Higher Level Than June; Drop From 1928 Figure

NEW YORK, Aug. 26—July production of automotive supplies continues to show higher figures than last year, although somewhat lower than the previous month, according to index figures just announced by the Motor & Equipment Association.

As was to be expected, shipments of original equipment during July showed a marked decline from earlier months, having an index figure, compared with January, 1925, at 100, of 205 as compared with 231 in June and with 203 in July a year ago.

Shipments of service parts and accessories during the month were slightly in excess of June shipments and service parts exceeded July of last year while accessories fell below last year's figure. The service parts index for July was 152 as compared with 150 in June and with 148 in July of last year. Accessory index was 92 as compared with 90 in June and 112 in July of last year. This condition is considered to be due to the fact that July has been one of the heaviest driving months of the year and car owners were buying more accessories and replacement parts during that month than in any previous month.

In anticipation of this same condition, service establishments bought much more heavily of service equipment in June than they did in July, by which month many of their supplies were already on hand. The July index for service equipment was 170 as compared with 186 in June and with 120 in July of last year. The service equipment industry has shown a much higher sales index throughout this year than it showed last year.

The grand index for the industry as a whole in July is 188 as compared with 208 in June and with 187 in July last year.

Wholesalers had a very active month, having an index of 136, their index being based on January of 1928 as 100. This July index compares with 132 in June and with 142 in May. In face of the increased sales, as compared with the previous month, wholesalers indicate a decrease in accounts receivable due to a better condition of collections throughout the country.

Crude Rubber is Active in Irregular Tradings

NEW YORK, Aug. 26—Trading in crude rubber was irregular but increased somewhat in activity last week, according to F. R. Henderson Corp. Some slight pressure was noticed as the result of increased stocks in London and Liverpool, together with considerable liquidation of September business. The market was somewhat steadied, however, by the United States Department of Commerce report of rubber invoiced during the week.

The seasonal let-up in tire production together with the fear of increased shipments from the East have contributed toward making the market at present somewhat on the low side. Stocks in London increased during the week to 33,573 tons and stocks in Liverpool to 5993 tons. Arrivals at all ports of the United States during the first 23 days of August are estimated at 24,100 tons with probable arrivals for the month placed at 35,000 to 36,000 tons.

Jersey Registration Gains

NEW YORK, Aug. 23—New car registrations in New Jersey during July totaled 14,276 as compared with 9809 in the corresponding month of last year, according to Sherlock and Arnold. Total registrations for the first nine months of the year were 84,169 as compared with 69,581 for the same period in 1928.

Ford to be Jubilee Host

NEW YORK, Aug. 23—Henry Ford will be the host in October of a group of men who were connected with Thomas A. Edison prior to 1886, who are known as the Edison Pioneer Men. These men will be Mr. Ford's guests on the occasion of Light's Golden Jubilee, the celebration in honor of the fiftieth anniversary of Mr. Edison's incandescent lamp.

Durant to Close Plant

NEW YORK, Aug. 26—Durant Motor Co. has notified the employees of the metal division in Elizabeth, N. J., which is the last remaining operating unit of its plant in that city, that production at that plant will end Sept. 30, and the plant will be closed by Oct. 15.

General Parts Stock is Admitted

DETROIT, Aug. 28—Fifty thousand shares of convertible preferred and 100,000 shares of common stock of the General Parts Corp. have been admitted to trading on the Detroit Stock Exchange, 50,000 shares of the convertible preferred stock have been admitted to trading on the Chicago Stock Exchange, and 100,000 of common will be traded on the Chicago Curb Exchange. The company's products include replacement and original parts in the automotive field.

Henry L. Barton

DETROIT, MICH., Aug. 24—Henry L. Barton, 67, for fifteen years a production executive of the General Motors Corp., died early today at the Ford Hospital after an illness of two months. He was a member of the Detroit Club, Detroit Country Club, Detroit Athletic Club and the Engineers Club of New York.

Small Lot Buying Prevalent in Steel

Producers Are Adjusting All Schedules for Hand-to-Mouth Sales

NEW YORK, Aug. 29—As usual, during the week preceding Labor Day, fresh developments in the steel market are few and far between. With the exceptionally heavy demand for sheets and strip-steel of the earlier summer months more and more giving way to small lot buying for prompt shipment, producers are again confronted with the necessity of adjusting operating schedules to that sort of hand-to-mouth buying.

Here and there one hears of the early application of the old remedy—announcement of higher prices for the fourth quarter—in order to speed the placing of orders at old prices in September.

While price-shading in black sheets has not been very incisive, the market is more or less ragged, and it is thought that an attempt will be made to correct this situation by revising the fourth-quarter price upward in the hope that the third-quarter price will be fully reestablished.

Full-finished automobile sheets continue firm on the 4.10 cents basis, and there is seemingly no intention to alter this level which appears to satisfy both producers and consumers. Some manufacturers of hot-rolled strip recently sounded the large consumers with a view to having the latter concede an advance of $2 per ton on current quarter business, but failed to gain their assent.

Middle West mills are enjoying a good demand for blue annealed sheets. Routine conditions prevail in the market for cold-finished steel bars and automotive alloy steels. The steel market, all along the line, is making a perfectly orderly retreat from a period of unusual activity.

A pause between the last buying movement and the crystallizing of fresh demand was unavoidable, the market's future depending altogether upon how long this pause will last.

Pig Iron—The market rules quiet and unchanged, but furnace interests are optimistic regarding the outlook and look for an early buying movement for the last quarter.

Aluminum—While the market is dull for the time being, better demand is looked for from automotive consumers after the holiday. Stocks in bonded warehouses at the beginning of July were approximately 2,000,000 lb. below those of the preceding month, but 2,500,000 lb. greater than at the beginning of July, 1928.

Copper—While Wall Street predicts an early advance in copper prices, in the copper market it is pointed out that several of the large producers are carrying heavy tonnages of unsold copper. In fact, in some quarters long-continued maintenance of the 18-cent market is seriously doubted. Much depends upon how export demand shapes up in the next few weeks.

Exports, Imports and Reimports of the Automotive Industry for July of Current Year, and Total for Seven Months Ending July, 1929

	Month of July				Seven Months Ending July			
	1928		1929		1928		1929	
	Number	Value	Number	Value	Number	Value	Number	Value
Automobiles, parts and accessories	..	$44,704,387	..	$47,180,748	..	$293,363,104	..	$386,132,120
Electric trucks and passenger cars	1	2,625	12	16,976	81	100,626	105	156,815
Motor trucks and buses, except electric (total)	12,785	8,112,538	26,463	12,868,778	71,733	48,977,426	129,245	74,011,562
Up to 1 ton, inclusive	9,405	4,708,080	22,908	9,482,451	54,534	28,089,365	97,793	43,074,336
Over 1, up to 2½ tons	3,134	2,895,338	2,863	2,641,327	15,356	16,354,058	29,915	25,338,506
Over 2½ tons	246	509,120	692	745,000	1,843	4,534,003	2,537	5,598,720
PASSENGER CARS								
Passenger cars, except electric (total)	38,885	23,657,447	29,082	18,968,341	233,239	163,917,955	248,692	170,158,679
Low price range up to $1,000	33,993	17,383,859	22,745	11,414,010	186,008	101,177,851	190,721	98,064,669
Medium price range, over $1,000 up to $2,000	4,381	4,968,211	5,659	5,914,464	40,615	46,305,793	51,059	55,470,892
High price range, over $2,000	511	1,305,377	678	1,639,867	6,616	16,434,311	6,912	16,623,118
PARTS, ETC.								
Parts, except engines and tires	..	..	..	..	..	..	..	..
Automobile unit assemblies	..	5,712,047	..	8,511,034	..	35,357,423	..	81,920,582
Automobile parts for replacement	..	5,077,794	..	5,443,677	..	30,165,830	..	45,191,186
Automobile accessories	..	788,383	..	822,687	..	5,497,085	..	6,396,791
Automobile service appliances	..	579,420	..	719,640	..	4,403,546	..	4,584,729
Trailers	75	22,555	45	23,490	425	164,893	570	270,730
Airplanes, seaplanes and other aircraft	17	231,705	23	346,190	103	1,172,459	217	3,593,264
Parts of airplanes, except engines and tires	..	243,549	..	230,719	..	770,644	..	1,284,244
BICYCLES, ETC.								
Bicycles	393	10,246	496	9,173	2,997	80,438	3,156	81,163
Motorcycles	1,229	282,711	430	118,995	11,667	2,704,131	11,343	2,579,803
Parts, except tires	..	130,933	..	98,420	..	862,689	..	694,649
INTERNAL COMBUSTION ENGINES Stationary and Portable								
Diesel and Semi-Diesel	13	83,192	29	85,151	333	614,122	478	715,247
Other stationary and portable	..	..	..	..	..	..	..	..
Not over 10 hp.	3,692	333,342	2,986	276,477	21,620	1,888,875	22,498	1,993,097
Over 10 hp.	790	318,317	188	246,760	2,615	1,062,619	2,689	1,388,145
Automobile engines for:								
Motor trucks and buses	2,289	211,617	248	61,938	9,330	942,091	7,255	973,130
Passenger cars	10,841	1,141,936	4,959	487,317	80,732	8,404,668	71,536	7,323,375
Tractors	85	27,554	93	41,049	312	94,146	549	162,724
Aircraft	18	81,662	50	163,081	83	302,029	228	993,363
Accessories	..	788,383	..	822,687	..	5,497,085	..	6,396,791
IMPORTS								
Automobiles and chassis (dutiable)	58	81,664	85	86,671	278	628,060	373	728,624
Other vehicles and parts for them (dutiable)	..	95,053	..	181,665	..	367,851	..	1,135,538
REIMPORTS								
Automobiles (free from duty)	..	..	..	..	..	..	..	1,573
Detachable	1,227	192,199	1,825	307,712	7,557	1,060,965	8,693	1,379,922
Other	214	105,922	311	142,832	1,925	1,000,795	3,004	1,301,782

Chapin Says Automobiles Are Asset to All Europe

NEW YORK, Aug. 29 — Roy D. Chapin, chairman of board of Hudson Motor Car Co., returned this week from a two and one-half months' trip to Europe, during which he represented the American Automotive Industry at the International Chamber of Commerce in Amsterdam, and the London meeting of the Bureau Permanent (international association of motor vehicle makers). He also was representative of the U. S. Government at the meeting of the commission for the International Road Congress, held in Paris in June. This congress is to be held in Washington, Oct. 7 to 11, 1930. Several thousand delegates from all over the world will attend this congress.

"Europe is increasingly finding that motor transport is a distinct economic advantage in national prosperity," he said. "Obstacles and prejudices which formerly existed are much less formidable today. Countries which have considerable highway systems, such as France, Germany and England, are rapidly adding to the number of motor cars in use." Mr. Chapin also stated that Monday, Jan. 6, of the New York Automobile Show week, is to be designated International Motor Day.

Javanese Asking for Bus Data

WASHINGTON, Aug. 29—The municipality of Semarang in Java is giving intensive study to the use of motor buses to relieve traffic congestion, according to a cable from Batavia received by the Automotive Division of the Department of Commerce this week.

Packard Honors "Masters" at World Sales Meeting

DETROIT, Aug. 28—The Packard Motor Car Co. this week entertained the 120 men in its world-wide distributing organization who this year won the honor of being known as master salesmen. The program of the three-day convention, which closed yesterday, included boating, golf and other forms of entertainment as well as dinners and business talks.

Lee J. Eastman, president of the Packard Motor Car Co. of New York and a vice-president of the manufacturing company, was among the speakers during the convention and Capt. L. M. Woolson, Packard aeronautical engineer, gave an address explaining the Packard Diesel Type Aircraft Engine. The leading Packard salesman in the world-wide organization is R. C. Webster of Baltimore, and Graham Loving of Washington was second.

Eight-Cylinder Cars Gain in Germany

WASHINGTON, Aug. 29—American low-price eight-cylinder cars are becoming increasingly popular in Germany, according to Assistant Commercial Attache Douglas Miller at Berlin, who has just filed a report with the Department of Commerce. Sales of six-cylinder cars continue at the same level, he reports, but the four-cylinder models are declining in importance, except for one make. According to the report about 68 per cent of all cars are sold on the instalment plan and trade-ins now figure in approximately 54 per cent of all sales.

Canadian Automobile Show Exhibiting 40 U. S. Makes

TORONTO, Aug. 28—The Canadian National Motor Show, which closes here Sept. 7, is the largest ever held in the Dominion. From the day of the opening, Aug. 23, the million-dollar automotive palace has been crowded with throngs from every part of the world. Forty-four makes of cars, including 40 United States-Canadian lines, and scores of accessory exhibits, make the showing the most varied ever held in Canada. A number of preannouncements are being shown, and special interest is centered about the Cord front-wheel drive automobile.

Westinghouse Cuts Lamp Prices

NEW YORK, Aug. 26 — Effective Sept. 1, there will be a reduction in the list prices of four types of 32-candlepower automobile headlight lamps, it is announced by A. E. Allen, vice-president of the Westinghouse Lamp Company. The reduction in the list prices averages 18.6 per cent and affects 8 per cent of the automobile headlight lamp demand.

M.E.A. Executive Committee Completes Plans for Annual Chicago Convention

NEW YORK, Aug. 28—The executive committee of the Motor and Equipment Association, at its meeting in Atlantic City last week, adopted a definite program for the coming year, completed arrangements for the annual show and convention at Chicago and laid plans for putting into effect the program of wholesaler distribution formulated and promulgated during the recent regional group meetings.

N. H. Boynton, president of the association, presided at the meeting, which was attended by J. M. McComb, Crucible Steel Co.; E. R. Seager, Pennsylvania Rubber & Supply Co.; W. S. Isherwood, AC Spark Plug Co.; C. H. Burr, SKF Industries; G. L. Brunner, Brunner Mfg. Co.; G. H. Niekamp, Beck & Corbitt Co.; E. N. Tarbell, Tarbell-Watters Co.; M. L. Heminway, managing director; B. W. Ruark, assistant managing director, and William H. King, Jr., attorney.

The committee approved the budget for the year Sept. 1, 1929, to Sept. 1, 1930, and adopted a new schedule of dues.

The committe adopted a program for the show to be held in the Coliseum, Chicago, Nov. 2 to 9, which program will center about distribution.

The committee also called a meeting of the membership committee to consider application for transfers and for new members to be held in Chicago Sept. 11.

A meeting of councilors of Divisions B and C has been called to formulate plans for putting into effect the wholesaler distribution plan.

Mr. Ruark gave a review of the eleven regional wholesaler group meetings held during July.

The program of the M. and E. A. show and convention to be held in Chicago is as follows:

Saturday, November 2:
Meetings on sales development activities, safety in traffic movements and of councilors of the three divisions.
Sunday, November 3:
Board of directors' meeting.
Monday, November 4:
General session at 10 a.m.
Following the opening there will be addresses by the president, vice-president and managing director and reports of various committees. An outside speaker who will be a well-known figure in the industry will also talk.
Tuesday, November 5:
Division and group meetings.
Wednesday, November 6:
Meetings of regional groups.
Thursday, November 7:
Councilors' meeting.
Banquet.
Friday, November 8:
Directors' meeting.
Saturday, November 9:
General session and adjournment.

Finds Humidity is Cause of Loss of Engine Power

WASHINGTON, Aug. 29—Automobile engines, like human beings, are inclined to loaf on the job when the weather is "muggy" or humid.

Tests recently concluded by the Bureau of Standards with a six-cylinder engine confirm results previously made by an automobile manufacturing concern with a one-cylinder engine to the effect that loss of power is due to humidity.

"This does not necessarily mean that the engine has less power when it is raining," the Bureau states, as it is quite possible to have more moisture in the atmosphere on a hot, "muggy" day, with no rain, than on a cooler rainy day. In other words the loss of power is proportional not to the relative, but to the absolute, humidity.

Rubber Consumption Drops

NEW YORK, Aug. 27—Manufacturers of tires and tire sundries consumed 120,726 long tons of crude rubber during the second quarter of 1929, according to answers to a questionnaire sent out by The Rubber Manufacturers Association. This consumption compares with 139,292 tons consumed in all rubber consuming industries during the quarter. Stocks on hand as of June 30 are estimated at 100,546 long tons with 44,967 tons afloat on that date. Estimated total sales value of tires and tire sundries shipped during the period is $218,341,000 out of $312,863,000 for the entire rubber industry. Production of reclaimed rubber is estimated at 63,107 tons with consumption placed at 62,297 tons.

Steel Products Co. Plans to Build Large Addition

DETROIT, Aug. 26—As the first move in an expansion program designed to extend over several years, the Detroit Steel Products Co., oldest and largest manufacturer of steel windows in the United States, and maker of automobile springs, has just purchased approximately 40 acres of land lying two miles north of the present factory on East Grand Boulevard, Detroit.

The first unit of a new factory will be erected on this site beginning immediately. It is now being designed by Smith, Hinchman & Grylls, Detroit architects, and will contain 125,000 sq. ft. of floor space, which will be used for the manufacture of motor springs. Ample acreage remains for the later erection of other units to accommodate the Fenestra branch of the business and for offices, warehouses and such other buildings as are necessary.

Donner Steel Buys Land

BUFFALO, N. Y., Aug. 27—The Donner Steel Co. has purchased a tract of land adjoining its plant as a site for a new steel finishing mill to cost about $2,000,000.

Airplane Engines Show Big Increase

First Half Better Than All of 1928, Manufacturers Say in Report

NEW YORK, Aug. 27—American airplane engine manufacturers produced 3826 motors during the first six months of this year, according to a report presented at a conference of airplane engine manufacturers by the Aeronautical Chamber of Commerce in Cleveland today. The conference is being held in connection with the national air races and exhibition held in that city this week. These engines had a retail value of $14,349,375 the report shows. This is an increase in production of 78 per cent during the first six months of 1929 over the entire output of 1928 with an increase in value of 20 per cent.

Airplane production according to further figures given out by the chamber totaled 3500 planes with a total retail value of $25,000,000 for the six months. These figures were presented at a conference of commercial plane manufacturers held yesterday in connection with this same meet.

Twelve states now have more than 100 licensed planes owned by individual or commercial concerns within their borders, the chamber revealed today. There is a total registration within the United States of 4225 licensed planes.

There are 232 approved airplane types now available on the market. Biplanes are in the majority in this listing, numbering 144 as compared with 88 monoplanes. There are 10 amphibians, four flying boats and seaplanes and nine convertible land or seaplanes bearing approved type certificates.

City Auto Stamping Will Issue Additional Stock

TOLEDO, Aug. 27—Approval of increase in capital stock from 150,000 to 225,000 shares, no par value, was voted by stockholders of City Auto Stamping Co., here today. New shares will be issued to present stockholders on warrants at $15 a share in ratio of new to each two held as of August 31. Rights will expire on September 30. New capital amounting to $1,125,000 will permit $750,000 addition to plant making total plant investment $1,500,000 and leaving more than $400,000 working capital.

Amos Lint, president, indicated that the company had booked an order for about $5,000,000 worth of stampings for Durant Motors for the coming year. Practically all the Durant large body and other stampings will be made in the Toledo plant. Machinery of the old Durant plant at Elizabeth, N. J., has been purchased by the local company and is being shipped here to go into the new section of the plant.

Men of the Industry and What They Are Doing

Robert T. Longway

who has been appointed assistant general manager of the Buick Motor Co. Mr. Longway, whose appointment as comptroller of the company was announced five months ago, will be succeeded by Harry G. Mengel, assistant comptroller, who has been with the company 15 years. The new assistant general manager has been associated with the automobile industry for the last 22 years, beginning with the Weston-Mott Co. in 1907. When that concern was absorbed by Buick nine years ago, Longway became an official of the latter company. Since that time he has been assistant treasurer, comptroller and vice-president

Howard Has Recovered

Sumner S. Howard, service manager of the AC Spark Plug Co., who has been ill for several months, has returned to his duties.

Harrison Joins Reading Chain

George R. Harrison has been named Cleveland representative for the Reading Chain & Block Corp., of Reading, Pa., manufacturers of overhead conveying equipment, hand and electric hoists and enclosed gear chain hoists.

De Soto Entertains Winners

L. G. Peed, general sales manager, and other officials of the De Soto Motor Corp. acted as hosts in a program of entertainment and instruction in honor of the 100 prize-winning De Soto Six salesmen in the sales contest which the corporation conducted among its dealers during July. The event included a visit through the De Soto plant, which recently completed its first year with sales of more than 80,000 cars, an excursion into Canada, and culminated in a banquet at the Detroit-Leland Hotel.

Goodrich Announces New Executive Appointments

The B. F. Goodrich Co. announces the reorganization of its entire executive system. T. G. Graham will be general manager of the tire division in charge of manufacturing and sales. J. H. Connors, in the mechanical division, has been appointed general manager in charge of manufacturing and sales. T. B. Farrington becomes head of the newly created factory service division.

J. W. Slade, in charge of the research laboratory, will report directly to J. D. Tew, president of the company. J. H. C. Miller becomes head of the original equipment department. The secretarial, comptrolling and treasury departments will remain the same.

Heads Champion Sales

Ralph H. Rowland has been appointed sales manager and Charles L. Corwin assistant sales manager of the Champion Spark Plug Co., president R. A. Stranahan has announced. The appointments are in the nature of promotions, both of the new executives having been at the head of sales activities in Champion's zone divisions at the time of their selection. Mr. Rowland has a record of successful activity as Champion's district sales manager for zone 5, with headquarters in San Francisco. He has been associated with the company since 1917.

Mr. Corwin joined Champion in 1914. He has been territorial representative and district sales manager in zone 1, which covers the New England States, New York, Pennsylvania, New Jersey and Delaware. His successor as district sales manager will be Harold A. Tillinghast, who is to retain eastern Pennsylvania territory in addition to managing sales activities of the zone. A. Ross Jarman, former western field engineer, will succeed Mr. Rowland and will take over the San Francisco territory.

Rugheimer Promoted by Wagner

Ralph R. Rugheimer has been appointed a member of the Atlanta branch sales office of the Wagner Electric Co., St. Louis. He has been in the electrical field for a number of years, and is a native of South Carolina.

Hobbs Joins Borg-Warner

John W. Hobbs, vice-president and general manager of the A. C. Norton Corp., Moline, Ill., subsidiary of the Duff Norton Co., has resigned, and on Sept. 1 he will become general manager of the Borg-Warner Co. plant in Galesburg, Ill. The Galesburg concern was formerly the Coulter Disc Co.

Allen D. Gutchess

president of The DeVilbiss Co., Toledo, is on a tour of the overseas subsidiary DeVilbiss companies and DeVilbiss foreign sales offices. Mr. Gutchess, accompanied by his wife, will be abroad for several weeks

Spooner With Day-Elder

Eugene F. Spooner has been appointed advertising and promotion manager of the National Motors Mfg. Co., makers of Day-Elder trucks and buses. Mr. Spooner, before his affiliations with Mack Truck and General Motors Export in advertising and promotional capacities, was for over ten years a member of the editorial staff of the Chilton Class Journal Publishing Co. He will be located in the company's factory office, Irvington, N. J.

McKee is Gardner Merchandiser

L. Z. McKee has been appointed merchandising manager of the Gardner Motor Co., Inc.

Prior to his connection with Gardner, McKee held an executive position with H. M. Ballard & Co., Chicago, merchandising counsellors. Before his connection with Ballard he held a responsible position with the Weaver Manufacturing Co., manufacturers of service station equipment.

Hudson Promotes McLarty

J. E. McLarty has been promoted to sales promotion manager of the Hudson Motor Car Co., Detroit. He joined the company in 1918, after serving as retail automobile salesman.

Larson, Handy Engineer, Returns

T. I. Larson, experimental engineer of the Handy Governor Corp. and its subsidiaries, has just returned from a three months' trip in Europe.

Borg-Warner Buys Two Corporations

Directors Declare $1 a Share on Common; $1.75 on Preferred

CHICAGO, Aug. 26—Directors of the Borg-Warner Corp. have declared a quarterly dividend of $1 per share on the common stock, $1.75 quarterly on the preferred stock, and announced the purchase of the Detroit Gear & Machine Co., manufacturers of transmissions, and its affiliated company, the Norge Co., manufacturers of electric refrigerating devices.

The transaction has been accomplished by the acquisition of all the common stock of these companies through an exchange of Borg-Warner common.

The Detroit Gear & Machine Co. is one of the old established gear companies serving a number of the leading automobile manufacturers. The Norge company is the exclusive manufacturer of the greatly improved and simplified rotary compressor used in electric refrigerators, according to C. S. Davis, president.

The regular quarterly dividends are payable Oct. 1 to stockholders of record Sept. 15. This establishes a $4 annual cash dividend on the Borg-Warner common stock, which is equivalent to $6 on the stock outstanding prior to the 50 per cent stock dividend.

Noblitt-Sparks Earns $3 as Sales Break Records

INDIANAPOLIS, Aug. 28—The Noblitt-Sparks Industries, manufacturers of automobile equipment with three large plants operating at full capacity, has announced an increase in its common stock dividend from $2 to $3 a share, as a result of record sales and net earnings for the first seven months of the year. During the period ending July 31, the company's sales were $2,466,000, with earnings after all deductions amounting to $252,000, or $3.35 a share on common stock. Sales for the same period of last year were only $946,000.

Sales so far this year have almost equaled the total for the entire year of 1928, and officials of the company expect even better sales and earnings during the remainder of 1929.

Stutz Torpedo is Ready

INDIANAPOLIS, Aug. 28 — The Stutz torpedo speedster is now ready for delivery, it was announced today at the headquarters of the Stutz Motor Car Co. of America here. The Torpedo is an ultra-sport, streamlined, two-passenger high speed automobile with the embodiment of the spirit of modern youth with a LeBaron body of special aluminum construction, contoured to obtain speed. The Torpedo engine is equipped with high compression head. The Torpedo is being offered in a number of strikingly modern color combinations which permit an expression of individuality in both interior and exterior.

Financial Notes

Hayes Body Corp., Grand Rapids, Mich., will offer stockholders rights to subscribe to one share of new stock at $20 a share for every five shares held, subject to approval of stockholders at special meeting, Sept. 4.

New financing involves issuance of 52,020 no par shares, which will bring outstanding capital stock to 312,120 shares. The $1,040,400 proceeds of new offering will be used for expansion and improvements at the Grand Rapids plant. Plans include doubling capacity of the stamping division.

Aeronautical Industries, Inc., reports that during the first seven months of this year net profits were more than $2 a share on the 100,000 capital shares outstanding. This figure is after all charges, including Federal taxes, and includes only realized profits, nothing having been allowed for paper gains on securities held.

Wilcox-Rich Corp. has reported a net profit of $1,000,871 for the first half of 1929, after all charges, including depreciation, interest and taxes. This compares with $527,964 for the first six months of 1928 and is equal to $10.22 a share on the Class A stock and $3.14 a share on the Class B stock.

United States Rubber Co. had consolidated profit of $596,926 for the first six months of 1929. Net sales amounted to $86,073,346.

Houdaille-Hershey Corp. has notified the New York Stock Exchange of a proposed increase in authorized Class B stock to 2,000,000 shares from 1,000,000.

Allis-Chalmers Mfg. Co. has called a meeting of stockholders for Sept. 20 to vote on an increase of common stock from 500,000 to 2,000,000 shares so that in place of the 286,000 shares now outstanding there will be 1,144,000 shares of new stock on the basis of four new shares in place of each share of present stock. It is expected that the dividend of the new stock will be at the annual rate of $2, or the equivalent of $8 a share on present stock on which the present rate is $7.

Curtiss-Wright Corp. will issue more than 80 per cent of the proposed Class A and common stock in exchange for stock in subsidiary companies which has been deposited, according to announcement made by Richard F. Hoyt, chairman of the board. Temporary certificates of Class A and common shares under warrants are now ready for issuance. This stock is now approved for listing on the New York Stock Exchange in the amount of 1,092,538 shares of Class A and 7,783,868 shares of common stock.

Studebaker Corp. has had approved for listing on the New York Stock Exchange an additional 1586 shares of common stock. This stock will be used for payment of stock dividends already declared and upon stock which was issued for the purchase of Pierce-Arrow Motor Car Co.

Packard Motor Car Co. reports new earnings for the nine months ended May 31 of $23,473,685, or $1.56 a share, on outstanding no par common stock. This compares with net profit for the year ended Aug. 31, 1928, of $21,404,605, or $1.43 a share, on stock then outstanding. Fifteen million shares of new common no par stock in the company have been listed for trading on the New York Stock Exchange.

Borg-Warner Corp. and subsidiaries in a statement filed with the New York Stock Exchange report net income for the six months ended June 30 of $4,554,427.

Kelsey-Hayes Wheel Corp. has declared regular quarterly dividend of 50 cents, payable Oct. 1 to stockholders of record Sept. 20.

Miller Rubber Co. reports net loss after all charges for the six months ended June 30 of $664,163. Operating profit was $274,593, depreciation and obsolescence $652,917 and interest, etc., was $285,839.

Autocar Co. has declared regular quarterly dividend of two per cent on preferred stock payable Sept. 15 to stockholders of record Sept. 5.

Hudson Motor Car Co. has declared regular quarterly dividend of $1.25 payable Oct. 11 to stockholders of record Sept. 11.

Autosales Corp. stockholders of record of Aug. 20 have received rights to subscribe to one additional share of common stock at $25 for every five shares held. There are 150,000 shares outstanding, now selling at a price which makes the rights worth about $1.80. The new financing is to provide funds for installation of the corporation's new vending shops in gasoline filling stations.

Europeans Will Join U. S. Delegates

NEW YORK, Aug. 27 — Delegates from various European nations for the World Engineering Congress to be held in Japan this fall will arrive in this country shortly and join the American delegation which sails from San Francisco on Oct. 10. Many of these European delegates will spend the intervening period in visiting mines, industrial plants and engineering institutes in this country.

Airports & Tool to be Financed

DETROIT, Aug. 20—J. D. Currie & Co. have acquired and will announce shortly a public offering of 50,000 shares of Class B stock of the recently announced Airports & Tool Corp., which has acquired all of the business of the Wayne Tool Co. and H. R. Krueger & Co., both of this city. The offering will consist of a unit comprising one share of convertible Class A stock at $21 and one-half share of Class B at $10.50 per share, making a total of $26.25 for each unit. Joseph Rothmeyer, head of the Wayne Tool Co., is to become president, and H. R. Krueger, vice-president. The board of directors will include Edward R. Naar, Chicago, and Louis Ruthenburg.

Foreign Automotive Agents Busy Here

Representatives Working on Deals; Study Methods

NEW YORK, Aug. 28—Foreign leaders in automotive transport are now active in this country, according to the report issued today by the National Automobile Chamber of Commerce.

Erich E. Walter, representing a firm of importers at Hamburg, is here to negotiate a large scale purchase of equipment for his company. His firm acts as agent for the Poland government and plans to buy a number of gasoline-driven rail locomotives and passenger cars to be substituted for steam train service on unprofitable branch railroad lines in Poland.

George Hauser, secretary to the chief technical manager of the Skoda Works at Prague, largest automobile manufacturers in Czechoslovakia, has been making a tour of different automobile plants in this country to study methods.

H. M. Zentzytski of Berlin, automobile writer for a number of leading European newspapers, is here studying bus and truck transportation and developments.

H. L. Witzer, representing Hanko, G.m.b.H., automobile distributors of Coblenz and Berlin, and a member of one of the leading German finance companies, is here inspecting methods of production, distribution and financing, which he thinks may be adaptable to German conditions.

Nelson Rounsevell, proprietor of the "Panama American" of Panama City, is studying the proposed highway route connecting the United States and the Latin republics, which he believes would give a marked impetus to the economic development of Panama when it is completed through that country.

Canadian Airplane Industry Continues to Forge Ahead as Production Increases

OTTAWA, Aug. 28—Progress in all phases of aviation continues to be recorded in Canada. This is summed up in figures published by the government's civil aviation branch for the second quarter of this year.

During that period 113 new aircraft were registered, bringing the number of commercial and private machines in operation at July 1 up to 337. During the three months 40 private licenses were issued, in addition to 63 to commercial pilots and 36 to air engineers. Licenses were granted to 17 airports in the quarter.

Montreal is emerging as a great center for the fabrication of aircraft with many manufacturing plants concentrated there. A group of Canadian financiers and business men has been formed in cooperation with the Fairchild Aviation Corp. of New York of the Fairchild Aircraft, Ltd., with an authorized capital of $2,000,000 for the manufacture of airplanes in the Canadian metropolis.

The company has acquired an area of 265 acres of land five miles from Montreal for the creation of an airport for both land planes and seaplanes, and for the erection of an airplane factory. Besides the factory buildings, hangars will be erected for land and seaplanes operated by the company, while others will be made available for rental to private owners.

There seems every possibility of Vancouver, too, developing as a center of airplane manufacture and source of supply for the Western Provinces. The Boeing Aircraft Co., which was established in the Pacific Coast city as a purely Canadian concern, utilizing Canadian materials exclusively, is making progress, and, according to report, negotiations are under way with the Great West Airways of Calgary, a commercial company which has experienced great expansion recently, for the purchase of airplanes and engines to the value of between $200,000 and $300,000.

Toronto is developing as an aerial center and junction. According to recent estimates, the money invested in aerial development in the Queen City now totals $2,500,000. The Canadian Airways there is constructing a large airdrome and adding six new machines for the Windsor air mail run.

Altogether there are three new airdrome projects under way, which will double the three already in use, while, in addition, a seaplane base is planned by the municipal authorities to be built in the harbor at an initial cost of $100,000.

Cadillac Makes New High Record for Twelve Months

NEW YORK, Aug. 29—The Cadillac Motor Car Co. recently ended the greatest 12 months in its history and was preparing for still more business in the next year, H. M. Stephens, general sales manager of the company, said yesterday at the opening of a two-day regional sales meeting in the Hotel Astor. Shipments of Cadillac and LaSalle cars in the fiscal year ending on July 31 were 40,965 units, or more than 11 per cent more than in the previous fiscal year. Mr. Stephens said the company's expansion program, started some months ago, was almost complete.

In addition to Mr. Stephens, Nicholas Dreystadt, general service manager, and seven other factory executives from Detroit are attending the meeting, with distributors, dealers, service managers and salesmen from New York, New Jersey, Delaware, Tennessee, Maryland and Virginia. Half of the time of the convention is to be devoted to service problems.

Canadian Goodyear Output Increased, Report to Show

TORONTO, Aug. 28—Goodyear Tire & Rubber Co. has about six weeks to go before its fiscal year comes to a close and it is understood that the year 1928-1929 has been one of the best that the company has ever enjoyed. The business benefited greatly from the extensions made to its West Toronto plant and early this year production was increased from between 8000 and 9000 tires a day to between 10,000 and 11,000 units daily.

Plans have been made for a further extension to the West Toronto plant and it is understood that the company has in mind the construction of a branch plant for western Canada. A split in the shares of the company is also rumored and the annual meeting of the company is being anxiously awaited.

Paramount Gets Big Order

NEW YORK, Aug. 28—A. S. Freed, president of the Paramount Cab Mfg. Corp., announced the receipt of a large order for cabs from the City Transportation Corp., delivery to begin in September. Mr. Freed said the order would dispose of the major part of the factory's production for the balance of the year.

Kari-Keen Aircraft Buys Dakota Propeller Concern

SIOUX CITY, IOWA, Aug. 24—The Dakota Airplane Co., Aberdeen, S. D., manufacturers of airplane propellers, has been purchased by the Kari-Keen Aircraft Co., Inc., of this city, it was announced this week by local Chamber of Commerce officials.

Production will be transferred to this city and started within the next two weeks, according to Arney Stensrod, manager of the Kari-Keen Propeller Co., which has been capitalized at $50,000. The Kari-Keen company has heretofore used Fahin propellers in all its airplanes. Difficulty in meeting demand for its products led the local company to negotiate for the acquisition of the Dakota firm.

Diamond T Offers New 6-Wheel Model

CHICAGO, Aug. 26—The Diamond T Motor Car Co. announces the addition of another six-wheel model to its line. Known as Model 1600, this new unit is rated at 8 tons. It is equipped with a six-cylinder, 4½ x 4¾-in. engine, seven-speed transmission and hydraulic brakes on all drive wheels. Dual pneumatic tires on the rear wheels and singles in the front are standard equipment. With this equipment it is stated that the new chassis will handle capacity loads at a speed of 25 m.p.h. in over-drive. Standard wheelbases are 174½ and 190 in.

Speed Limit Should Go, Says British Royal Commission Transport Report

LONDON, Aug. 28—Statistics concerning new car registrations during March to May of this year, issued by the British Ministry of Transport, show that in Great Britain, for the first time, the 7 hp. type of car heads the list in popularity, displacing the 12 hp. type which has been foremost for many years and which is now second.

The percentage of 7 hp. models is now 22.5, which compares with 19.4 during the preceding three months and 16.6 during the corresponding period last year. The 12 hp. percentages have fallen from 25 per cent in Sept.-Nov. 27 to 18.1 during Mar.-May this year.

Models of 16 hp., representing the increasingly popular light Sixes, have again advanced, now being third in percentage of new cars registered (10.5 per cent); 14 hp. models retain fourth place with 7.0 per cent.

The increasing output of the English Ford, rated at 15 hp., has not caused this size to show increase in percentage; it has actually fallen from 5.5 to 5.1 since the Dec.-Feb. period, though there is an increase in the past twelve months from 2.9 per cent. Ratings of American cars are all very far down the list, the 21 hp. class being the highest with 1.2 per cent of new registrations and the 24 hp. next with 1.5 per cent.

The total number of new cars of all sizes registered during the period under review (March to May 1928) was 58,028, which compares with 37,164 during the preceding three months and 56,118 in the corresponding period last year.

The percentage of sedans has receded slightly, viz., from 82.2 to 82.1 (there were only 67 per cent twelve months ago). The fall would have been greater but for a marked increase in the percentage of closed bodies on the 7 hp. models.

The increase in percentage of Sevens and their movement into first place is due, no doubt, to the introduction and gradually increasing output of the Morris Minor, and though it is not improbable that the Austin Seven still represents the biggest number of new registrations in this class, there is no way of confirming that supposition in the absence of production figures.

Graham and Cord Merger Rumors Denied by Qualy

TOLEDO, Aug. 24—Reports of an impending merger between the Willys-Overland Co. and the Graham Paige Motor Co. were vigorously denied here by A. B. Qualy, secretary of Willys-Overland. The rumor arose from a visit of the three Graham Brothers to the Willys-Overland plant Wednesday.

L. B. Manning, vice-president of the Cord Corp., also issued yesterday a denial of the story that E. L. Cord, president of the Auburn Automobile Co., has been offered the presidency of the Willys-Overland Co. Mr. Cord has his time completely occupied at present with the growth of Auburn and its affiliated companies, Mr. Manning said.

William O. Strauss

CINCINNATI, Aug. 22—William O. Strauss, 39, director and works manager of the R. K. LeBlond Machine Tool Co., Cincinnati, died at the Petoskey Hospital, Petoskey, Mich., Aug. 18, following an emergency operation for appendicitis. He was born in Atlanta, and after positions as draftsman, salesman and advertising manager, rose to the position of works manager.

British Seek Light Tractors

WASHINGTON, Aug. 28 — British engineers are considering the development of a lightweight tractor to compete with tractors of American manufacture, it was declared by W. M. Park, of the Agricultural Implements Division of the Department of Commerce this week. There are now about 19,000 tractors in use in Great Britain, he said, and nearly all of these are of American manufacture. Efforts are being made to develop home manufacture of lightweight tractors which will meet domestic conditions.

Nicaragua Asks U. S. Aid

WASHINGTON, Aug. 26—The Nicaraguan Government has requested the cooperation of the United States in the construction of an inter-American highway in Nicaragua, according to an announcement this week by the State Department. Under the terms of a Congressional Resolution this Government is authorized to expend $50,000 to cooperate with any Latin-American Government in reconnaissance surveys in connection with highway construction. The Nicaraguan Government plans to build a highway to the Honduran frontier.

Denmark Uses More Motorcycles

WASHINGTON, Aug. 22—A tremendous increase of motorcycles imported into Denmark is noted for the first half of this year, according to a report received at the Department of Commerce from Copenhagen. Imports for the first six months of this year aggregated 2337 machines as compared with 2400 for the entire year of 1928, the report says.

Dill is Expanding Plant

CLEVELAND, Aug. 26—The Dill Mfg. Co., makers of valves and valve parts, has announced the purchase of a five-acre parcel of land and plans are already under way for a new plant that will afford the company many times its present capacity.

Canadian Exports Gain 100 Per Cent

Total of $26,727,784 Reached for First Six Months, Report Says

WASHINGTON, Aug. 29—Canadian automotive exports during the first half of this year increased 100 per cent over shipments during the corresponding period of 1928, according to an nouncement made this week by the Department of Commerce.

According to the announcement, automotive shipments from Canada had a total value of $26,727,784 as compared with $13,369,186 for the first half of 1928. Passenger car exports jumped from $9,709,847 to $17,268,030 and truck exports increased from $2,834,422 to $8,296,111. Exports of passenger cars in the low price class more than doubled in number while those in the high price field decreased from 1819 to 381.

Australia, which held the leading position as a market for Canadian passenger cars in the first half of 1927 but dropped to third place in the same period of 1928, regained first position. Australia also held first place as a purchaser of trucks.

Shipments from Canada during June, however, totaled 8219 units valued at $3,474,633, a decrease of 14 per cent in number and 17.8 per cent in value as compared with the previous month of May. At the same time production showed a seasonal decline.

The average price of passenger car units exported during the first half of this year was $445 as compared with $519 for the corresponding period of 1928.

Vickers to Float U. S. Issue

NEW YORK, Aug. 28—Vickers, Ltd., British industrial concern, will float in the American market a group of depository receipts which will be known as American shares. These receipts will be issued against actual deposits of shares in the British company in the London and New York offices of the Guaranty Trust Co. and will probably be listed for trading on the New York Curb Exchange and later on the New York Stock Exchange. Vickers, Ltd., manufactures, among other things, motor engines and airplanes.

American LaFrance Branch Moves

ELMIRA, N. Y., Aug. 27—The Utica office and plant of the American LaFrance & Foamite Corp. will move to the company's main plant and general offices at Elmira.

Whitcomb is Building

ROCHELLE, ILL., Aug. 28 — The George D. Whitcomb Co., manufacturers of industrial and railway locomotives, has broken ground for a new factory unit.

New Canton Drop Forging Unit Nearing Completion

CANTON, Aug. 24—Construction of the final unit of the new factory building which will convert the old plant of the Canton Drop Forging and Mfg. Co., into a modern manufacturing unit for straight-line production of aircraft and automobile parts, is well under way. The work will be completed within a few weeks.

The new building will house the machinery which is being transferred from the old building as well as new equipment that will be used to make motor parts. The structure is of steel throughout and when completed the building will be more than 450 ft. in length and 65 ft. in width.

Curtiss to Spend $3,000,000

NEW YORK, Aug. 26—Curtiss Airports Corp. is planning the expenditure of $3,000,000 on the development of a seaplane airport at Alameda, Cal., on a 600-acre site which it has acquired there. This port will comprise a seaplane base, flying field, a yacht harbor and a bathing beach. The airport will have all the facilities necessary for an AIA rating from the Department of Commerce.

Canadian Fords Near Million

DEROIT, Aug. 26 — Wallace R. Campbell, president of the Ford Motor Co. of Canada, Ltd., stamped the serial number of the 900,000th Ford engine manufactured within the Dominion, at a ceremony Aug. 19, commemorating the silver anniversary of the company. It required about 23 years for the company to manufacture approximately 750,000 Model T Ford automobiles. In the period of little more than a year and a half Model A production has aggregated approximately 150,000 units.

English Girls Drive at 60 Miles in Test

LONDON, Aug. 24—Violet and Evelyn Cordery have ended their drive of 30,000 miles at more than sixty miles an hour around Brooklands in their Vista car.

They started on June 18 to make a record to prove the durability of the car and with the exception of Sundays and certain days when not allowed to race they took three-hour turns at the wheel for 12 hours daily.

G. E. Supply Corp. is Formed

SCHENECTADY, N. Y., Aug. 28—The 14 wholesale distributing corporations owned by the General Electric Co. will be consolidated into the General Electric Supply Corp., effective Oct. 1. These companies have for many years distributed General Electric products and the plan involves no change of ownership. The consolidated corporation will be in a much better position to offer nation-wide service through its ability to give service from any one of 76 houses, through interchangeability of stocks, and speedier and more economical operation, it was announced.

G.M. Institute Graduates 32 Men

FLINT, MICH., Aug. 24—Thirty-two young men students of the General Motors Institute of Technology who have completed the four-year cooperative engineering course were honored in a series of functions this week beginning with a baccalaureate service here Sunday and an alumni banquet Friday evening. The class, the second to be graduated, is just twice the size of the first group graduated last August.

Heinn-Werner Takes Over Milwaukee Pump Company

MILWAUKEE, Aug. 24—The Milwaukee Circulating Pump & Mfg. Co. has been reorganized as the Heinn-Werner Motor Parts Corp., following the acquisition of a large interest in the concern by S. A. Perkins, secretary and treasurer of the Waukesha Motor Co. The plant and offices are being moved to Waukesha, where, adjacent to the motor works, a brick and steel plant, 175 x 300 ft., has been erected, with a two-story office portion.

With equipment, the cost exceeds $150,000. Most of the Heinn-Werner output has been absorbed by the Waukesha Motor Co., and with the material expansion of its production and enlargement of the line to include 300 hp. motorail engines, it was necessary to make provision for a larger pump unit supply, which is being effected by transferring the Milwaukee to Waukesha.

Navy Builds Airplane

WASHINGTON, Aug. 26—The Naval aircraft factory at Philadelphia has just completed a new type of naval fighting plane of unusually high speed which will soon undergo tests at the Naval Air Station at Anacostia, D. C., the Navy Department announced this week. The plane, bearing the designation F6C-3 is a modified Curtiss "Hawk" employing ethylene glycol as a cooling fluid.

Vocal Radio to Aid Flying

NEW YORK, Aug. 26—The Universal Aviation Corp., one of the operating units of the Aviation Corp., will install vocal radio apparatus in its transport planes operating on Mid-West lines. This will be used for transmission of weather reports to pilots in flight together with other useful purposes.

Calendar of Coming Events

SHOWS

Automotive Exhibit, Canadian National Exhibition, Toronto ....Aug. 23-Sept. 7
Vienna Fair .....Sept. 1-8
International Aircraft Exhibit, Coliseum, Chicago .....Sept. 7-15
National Machine Tool Builders' Exposition and Congress, Cleveland, Sept. 30-Oct. 4
Paris, Automobiles .....Oct. 3-13
London, Automobiles .....Oct. 17-26
Prague, Automobiles .....Oct. 23-30
Paris, Motorcycles .....Oct. 23-Nov. 3
M.&E.A. Show and Convention, Chicago .....Nov. 4-9
N.S.P.A. Show and Convention, Detroit .....Nov. 11-16
Berlin Auto Salon .....Nov. 14
London, Trucks .....Nov. 7-16
Paris, Trucks .....Nov. 14-24
London, Motorcycles .....Nov. 30-Dec. 7
Brussels Auto Salon.....Dec. 7
New York National.....Jan. 4-11
Newark (N. J.) Automobile Show.Jan. 11-18
Boston Automobile Show.....Jan. 13-25
Chicago National, Coliseum..Jan 25-Feb. 1
Cleveland Automobile Show..Jan. 25-Feb. 1

CONVENTIONS

American Welding Society, Fall Meeting and Exposition, Cleveland....Sept. 9-12
American Institute of Mining and Metallurgical Engineers, Cleveland, Sept. 9-12
American Society for Steel Treating, Convention and Exposition, Cleveland .....Sept. 9-13
American Chemical Society, Fall Meeting, Minneapolis .....Sept. 9-13
A.S.M.E.—Iron and Steel Division—National Meeting, Cleveland....Sept. 9-13
West Virginia Motor Transportation Association, Charleston.....Sept. 11
Society for Electrical Development, New York City .....Sept. 13
Eastern States Exposition, Springfield, Mass. .....Sept. 15-21
American Electric Railway Association, Atlantic City .....Sept. 28-Oct. 4
National Industrial Advertisers Assn., Cincinnati .....Sept. 30-Oct. 2
National Safety Congress, Annual, Chicago .....Sept. 30-Oct. 4
Penna. Automotive Association, Erie, Pa. .....Oct. 7-8
Permanent International Association of Road Congresses, Sixth Session, Washington, D. C.....Oct. 7-11
Associated Business Papers, Chicago, Oct. 14-17
Society of Industrial Engineers, Detroit .....Oct. 16-18
National Hardware Association, Atlantic City .....Oct. 21-24
Society of Industrial Engineers, Sixteenth Annual Meeting, Hotel Statler, Cleveland .....Oct. 23-25
Amer. Gear Mfrs. Asso., Phila...Oct. 24-26
World Engineering Congress, Tokio, Japan .....Oct. 29-Nov. 22
National Automotive Parts Association, Detroit .....Nov. 6-8
Highway Research Board, Ninth Annual Meeting, Washington, D. C. Dec. 12-13
National Automobile Dealers Association, New York City .....Jan. 6
American Roadbuilders Association, Atlantic City .....Jan. 11-18
National Automotive Dealers Association, Chicago .....Jan. 27-28
Southwest Road Show and School, Wichita .....Feb. 25-28

RACES

National Air Races and Show, Cleveland, Aug. 24-Sept. 2
European Grand Prix, Italy.....Aug. 31
Altoona, Pa. .....Sept. 2
Schneider Trophy (Aeronautical), Calshot, England .....Sept. 7
Syracuse .....Sept. 8
Toledo .....Sept. 15
Los Angeles .....Nov. 17

S. A. E.

Production Meeting, Cleveland.....Oct. 2-4
Transportation Meeting, Toronto.Nov. 12-15
Annual Meeting, Detroit.....Jan. 21-24

SALONS

Hotel Drake, Chicago .....Nov. 9-16
Hotel Commodore, New York City.Dec. 1-7
Hotel Biltmore, Los Angeles.....Feb. 8-15
Palace Hotel, San Francisco, Feb. 22-Mar. 1